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GENERAL INDEX.

(Illustrated articles are designated by an asterisk * before the page number.)

Algæ of Maine, the Fresh Water, 111. *118.
Alaska, Impressions of, 178.
American Weeds, A Century of, 141.

Ballast-Plants at South Bethlehem, Penna., 9.
Binomials, Some Duplicate, 15.
Botanical Notes, 22, 50, 95, 131, 230, 255, 273, 311, 340, 382.
Buchloë dactyloides, Engelm., not a Diœcious Grass, 303.

California Plants, New, 91.
Canby Herbarium, The, 336.
Chestnut, on the Names of the American, 152.
Conidia-Bearers in Acrostâlagmus, Corda, Notes on the Development of, *10.
CONTRIBUTORS:
    Allen, T. F., 230.
    Atkinson, Geo. F., *171.
    Bailey, W. Whitman, 255, 271.
    Briggs, F. P., 333.
    Britton, E. G., 24, 97, 98, 99, 100, 135, 165, 169, 189, 257, 260, 273, 275, 276, 317.
    Britton, N. L., 1, 23, 50, 66, 68, 81, 101, 132, 156, 163, *219, 236, 277, 279, 280, 319, 320, 323, 342, 345, 348, 385, 391.
    Cockerell, T. D. A., 95.
    Cooley, Grace B , 178, 249.
    Coville, Frederick Vernon, 309.
    Cummings, Clara E., 247.
    Davis, William T.. 301.
    Deane, Walter, 125.
    De Candolle, Casimir, 47, 254.
    Eckfeldt, J. W., 249.
    Ellis, J. B., 158.
    Foerste, Aug. F., *267.
    Graves, Ch. B., 96.
    Gregory, Emily L., *75, 132, 157, 313.
    Halsted, B. D., 5, 22, 43, 84, 131, 141, 199.
    Harvey, F. L., 93, *118, 340.
    Havard, V., 29.
    Hemsley, W. B., 97.
    Hill, E. J., 17, 306.
    Hollick, Arthur, 25, 101, 159, 164, 166, 168, 273, 330, 342, 347, 388.
    Johnson, L. N., 88.
    Kain, C. Henry, 27, 67, 104, 132.
    Lazenby, W. R., 16.
    Leiberg, J. B., 7.
    MacMillan, Conway, *10, 15.
    McDonald, Frank E., 273, 312.
    Meehan, Thomas, 341.
    Middleton, R. M., 340.
    Mohr, Charles, *308.
    Morong, Thomas, 226.
    Nash, Geo. V., 255.
    Pammel, L. H., 375.
    Parish, S. B., 91.
    Penzig, O., 227.
    Plank, E. N., 303.
    Porter, Thomos C., 10, 128.
    Redfield, John H., 341.
    Ries, Heinrich, *36.
    Rowlee, W. W., 312.
    Schinz, Hans, 382.
    Schneck, Jacob, 195.
    Schneider, A., *203.
    Scribner, F. Lamson—, *154.
    Small, John K., 95, 195, 352.
    Sudworth, Geo. B., 22, 79, 152.
    Swezey, G. D., 94.
    Underwood, Lucien M., 269, 299, 325.
    Vail, Anna Murray, 24, 107, 159.
    Wibbe, J. H., 23.
    Williams, R. S., 192.
    Williams, Thos. A., 81.

Eastern and Western Weeds, 43.
Eastern Flora, Some Additions to our, 128.
Enumeration of Plants Collected by Dr. H. H. Rusby in South America, 1, 148, 263, 371.
Eriocaulon bilobatum, 226.

Flora of a Montana Pond, The, 192.
Flora of Connecticut, Notes on the, 88.
Flora of Nebraska, Additions to the, 94.
Frankia in the United States, The Genus, *171.

Hepatic Flora of the Manual Region, A few Additions to the, 299.
Hepaticæ of Labrador, The, 269.
Host-plants of Aphyllon fasciculatum, The, 17.

Index to Recent Literature Relating to American Botany, 25, 66, 97, 133, 160, 195, 231, 256, 273, 318, 343, 383.
Interesting Oaks Recently Discovered on Staten Island, 301.

Juncus Cooperi, The Re-discovery of, 309.

Leucobryum minus, Hampe, 189.
Lichens, An Enumeration of Some Rare North American, 249.

Meibomia, Heist., A Preliminary List of the Species of the Genus occurring in the United States and British America, 107.
Monilia fructigena, Pers. and Spore Germination, 5.
Mulberry, An Economic, 21.

Newberry, Death of Dr., 392.
New or Noteworthy North American Phanerogams, *219.
Nomenclature Question at Genoa, The, 325.
Notes upon Maine Plants, 340.

Oldest Specific Name, The Validity of the, 95.
On the Casting-off of the Tips of Branches of Certain Trees, *267.

Palæobotany of the Yellow Gravel at Bridgeton, N. J., 330.

Parasitic Fungi as Related to Variegated Plants, 84.
Peronosporaceæ, Notes on, 81.
Phænological Notes, 375.
Piperaceæ Bolivianæ, 47, 254
Plants Collected at Mt. Katahdn, Me., Aug., 1892, 333.
Plants Collected in Alaska and Nanaimo, B. C., July and August, 1891, 239.
Polygonum, A Preliminary List of American Species of, 352.
Proceedings of the Botanical Club of Forty-first Meeting of the A. A. A. S., Rochester, N. Y., 281.
Proceedings of the Club, 33, 73, 105, 139, 170. 201, 237, 349, 391.
Programme of the International Botanical Congress of Genoa, 1892, 227.

Ranunculus abortivus, L., Varieties of, 93.
Reviews of Foreign Literature, 23, 50, 132, 156, 313, 342.
Review of the North American Species of the Genus Xyris, *36.
Rhizobia, Observations on some American, *203.
Rhizomes of Penthorum sedoides, as Leafy Shoots, 306.
Rhus, on the Names of Two Species of, 79.

Spirogyra Cells, An Abnormal Growth of, *75.
Stipa Richardsoni, Link, aud Stipa Richardsoni, Gray, *154.
Sullivant Catalogue of the Plants of Franklin Co., Ohio, with the List of 1891, by Selby and Craig, Comparison of the, 16.

Tripterocladium leucocladulum, Muell., Some notes on, 7.

Variations in the Leaves of Clematis reticulata and other notes, *308.

Watson, Sereno, 125.

Xyris, Review of the North American Species of the Genus, *36.

GENERIC INDEX.

Abatia, 235.
Abies, 25, 31. 334.
Abolboda, 260.
Abronia, 26.
Abutilodes, 54.
Abutilon, 85, 144.
Acacia, 103.
Acalypha. 62, 85, 97, 145, 385.
Acanthomyces, 233.
Acanthospermum, 148.
Acer, 71, 134, 240, 255, 376.
Acerates, 231.
Acetabularia, 278.
Acetosella, 55.
Achnanthes, 28.
Achroanthes, 63.
Achyrocline, 148.
Achyrodes, 64.
Aciachne, 258.
Aconitum, 182, 239.
Acrostalagmus, 18.
Acrostichum, 200.
Actæa, 239.
Actinea, 58.
Actinella, 58, 94.
Actinocyclus, 28, 67.
Actinomeris, 59, 385.
Actinoptychus, 28, 319.
Acuan, 55.
Acuba, 85.
Adiantum, 25, 182, 278, 289.
Adicea, 63.
Adelia, 60.
Adenocaulon, 242.
Adenophyllum, 59.
Adenostegia, 61.
Adesmia, 56.
Adlumia, 53, 349, 350.
Adnaria, 59.
Adonis, 380.
Adopogon, 58, 385,
Adorium, 57.
Æchmea, 66.
Æcidium, 277.
Æschynomene, 384.
Æsculus, 25, 55, 267.
Afzelia, 61
Agaricus, 161.
Agastache, 62, 385.
Agave, 25, 30, 137, 256, 260, 277.
Ageratum, 58, 85.
Agoseris, 58.
Agrimonia, 221.
Agropyrum, 144, 260, 286, 336.
Agrostis, 164, 335, 336 346, 386.
Ailanthus, 160, 267.
Albizzia, 56.
Alectoria, 180, 245.
Aletris, 90.
Alhagi, 107.
Alhonia, 62.
Alisma, 194.
Allenrolfea, 62.
Allium, 45, 147, 245.
Allocarya, 234.
Alnus, 134, 171, 244, 335.
Alocasia, 85.
Alopecurus, 182, 386.
Alophia, 235.
Alsia, 275.
Alsine, 54.
Alstrœmeria, 260.
Altenanthera, 85.
Althæa, 257.
Alveolaria, 136.
Alyssum, 53, 67, 234.
Amarantus, 10, 46, 83, 144, 260, 318, 380.
Amblyopappus, 58.
Amblystegium, 24.
Ambrosia, 147, 195.
Amelanchier, 280, 293, 323, 331, 376.
Amellus, 58.
Amianthium, 63, 385.
Amicia, 237.
Ammannia, 68.
Amorpha, 44.
Amphicarpa, 56.
Amphicarpæa, 209.
Amphidium, 318.
Amphilophium, 235.
Amphiprora, 28, 67.
Amsonia. 259.
Amygdalus, 381.
Amyris, 30, 55.
Ananas, 30.
Anaphalis, 242.
Anchusa, 10
Andropogon, 33, 65, 164, 286.
Androsace, 384.
Anemone, 183, 231, 239, 284, 376.
Aneura, 99.
Anhalonium, 383.
Anidrum, 57.
Anil, 55.
Anila, 55.
Annesleya, 56.
Annularia, 197.
Anœctangium, 318.
Anomalophyllites, 332.
Anona, 60.
Anonymos, 66.
Antennaria, 242, 376.
Antephora, 304.
Antirrhinum, 10, 233.
Antitrichia, 248.
Anthemis, 138, 144, 146, 260.
Anthoxanthum, 343.
Antogœringia, 57.
Anthriscus, 57.
Anychia, 95.
Aphelandra, 256,
Aphyllon 17, 195.
Apiocystis, 129.
Apios, 15, 380.
Aplopappus, 196, 233.
Apocynum, 142, 286.
Aquilegia, 69, 140, 182, 239.
Arabis, 54, 220, 240.
Arachis, 30.
Aræococcus, 68.
Aralia, 85, 89
Araucaria, 195.

Arbutus, 134, 243
Arceuthobium, 197.
Arctium. 142, 260.
Arctomecon, 196.
Arctostaphylos, 19, 31, 104, 274, 335, 349.
Ardisia, 60.
Arenaria, 98, 195, 240, 335, 349.
Argemone, 94, 98.
Arisæma, 318.
Aristida, 91, 99, 164, 386.
Aristolochia, 88, 343, 383.
Armeria, 60.
Armillaria, 25.
Arnica, 242, 335.
Aromia. 58.
Artemisia, 17, 82, 84, 242, 261.
Arthrophycus, 159.
Arundinella. 256.
Asarum, 33, 98, 321.
Asclepias, 46, 231, 256, 380.
Ascyrum, 231.
Asimina, 331.
Aspergillus, 25
Asphodeliris, 63.
Aspidium, 65, 182, 246, 344.
Aspidistra, 85
Asplenium, 90, 134, 140, 256, 340, 350.
Asprella, 64, 95, 385.
Aster, 2, 26, 70, 89, 91, 140, 192, 224, 242, 311, 318, 323, 335, 343, 381, 383, 385.
Asterina, 277.
Astilbe, 85.
Astragalus, 44, 57, 70, 85, 240, 340.
Astrophyllum, 318.
Athenæa, 285.
Atrichum, 248.
Atriplex, 133. 244, 343.
Audibertia, 278.
Auxemma, 235.
Avena, 260.
Axinæa, 279.
Ayenia, 135.
Azalea, 59
Azedarach, 55.

Bacillus 214.
Baccharis, 3.
Badianifera, 53.
Bæomyces, 249.
Bahia, 59, 70.
Balansia, 285.
Baptisia, 44, 258.
Barbarea, 144, 259.
Barbeyastrum, 23.
Barbula, 100, 289.
Barnadesia, 265.
Barneoudia, 231.
Bartramia, 70.
Basilima, 57.
Batrachospermum, 119, 289.
Bauhinia. 135.
Bazzania, 198, 246.
Beccarianthus, 23.
Beccariella, 72.
Begonia, 85.
Belamcanda, 63.
Bellis, 384.
Bellucia, 279.
Beloperone, 384.
Benevidesia, 23.
Benzoin, 62.
Berberis, 26, 239, 349.
Bermudiana, 63.
Betula, 334.
Betulites, 390.
Beurera, 53, 61, 385.
Bicuculla, 53, 385.
Bidens, 151.
Bigelovia, 70.
Bifora, 57.
Bisglaziovia, 23.
Bispora, 25.
Blakea, 279.
Blepharipappus, 276.
Blepharostoma, 269.
Blindia, 247,
Bœhmeria, 68.
Boerlagea, 23.
Boisduvallia, 193, 241.
Bolelia, 234.
Boletus, 161.
Bomarea, 260, 343.
Borrago, 380.
Botrychium, 31, 89, 318.
Botryosporium, 14.
Bourreria, 61.
Bouteloua, 192, 304.
Boykinia, 57, 68, 241.
Brachelyma, 317.
Brachyelytrum, 386.
Brachyhymenium, 70.
Brachysporium, 198.
Bradburya. 55.
Brandegea, 27.
Brassica, 9, 45, 82, 83, 138, 144, 296.
Brevoortia, 234.
Breweria, 259, 347.
Brickellia, 58, 196, 346.
Brittenia, 23.
Brittonamra, 55.
Brodiæa, 245.
Bromelia, 68.
Brosimum, 30.
Brossea, 59.
Brunella, 144, 244.
Buchloë, 64, 303.
Buekleya, 62.
Buda, 54.
Buddleia, 135, 196.
Buellia, 250.
Bulbilis, 64.
Burrillia, 196.
Bursa, 54.
Buthotrephis, 159, 344, 347.
Bryanthus, 183, 243, 335.
Bryoziphium, 24, 257.
Bryum, 70, 100, 247.

Cacalia, 58.
Cacara, 55.
Cactus, 57.
Cæoma, 285.
Cæsalpinia, 133, 278, 384.
Cæsalpinioides, 56.
Calamaria, 65.
Calamagrostis, 164, 386.
Calamintha, 62.
Calamites, 159.
Calamistrum, 65.
Calandrinia, 26.
Calceolaria, 54.
Calea, 151.
Calla, 89.
Calliandra, 56, 135.
Callichroa, 234.
Callipteridium, 197.
Callipteris, 197.
Callirhoë, 380,
Calluna, 201.
Caltha, 156.
Callitriche, 54, 57, 68, 87.
Calochortus, 94, 135, 384.
Calophanes, 62.
Calopogon, 63.
Calopogonium, 278.
Calvaria, 201.
Calycanthus, 53, 385.
Calycera, 9
Calypogeia, 99.
Calystegia, 61.
Calyptranthes, 57.
Camara, 62.

Camarops, 162.
Camellia, 30.
Campanula, 182, 243, 274, 335.
Camptosorus, 140.
Camptothecium, 248.
Campylodiscus, 28.
Campylopus, 24, 295.
Campulosus, 64.
Canistrum, 68.
Canna, 133.
Capethia, 231.
Capnodes, 53, 68.
Capnorchis, 68.
Capparis, 343.
Capraria, 61.
Caprifolium, 58, 197.
Capsella 46, 54, 82, 83, 144, 323, 376.
Cardamine, 54, 58, 69, 214, 240, 217.
Carelia, 58.
Carex, 31, 89, 90, 169, 234, 246, 336.
Carica. 29, 57.
Carludovica, 384.
Caruelina, 58.
Carya, 63.
Caryospora, 25.
Cassandra, 60.
Cassia, 135, 209, 237, 383.
Cassiope, 243, 335.
Castalia, 53, 322.
Castanea, 152, 332.
Castilleia, 186, 244.
Casuarina, 165.
Catalpa, 267.
Catasetum, 383.
Cathea, 63.
Cathestechum, 256.
Catostemma, 133.
Caulerpa, 278.
Caulophyllum, 94.
Ceanothus, 171.
Cebatha, 53.
Celastrophyllum, 389.
Celtis, 199, 271, 377.
Cenchrus, 46, 147, 285, 386.
Centaurea, 60, 88, 138, 268, 380.
Centaureum, 60.
Centaurodes, 60.
Centranthus, 223.
Centropogon, 104, 371.
Centrosema, 55.
Cephaelis, 58.
Cephalanthera, 63.
Cephalozia, 246, 269.
Cerastium, 240, 341.
Cerasus, 349.
Ceratodon, 70, 100, 247.
Ceratocephalus, 58.
Ceratocystis, 262.
Ceratomyces, 233.
Ceratophyllum, 90.
Ceratoschœnus, 233.
Cercidium, 103.
Cercis, 33, 103, 136.
Cercocarpus, 280.
Cercospora, 7, 160, 195, 232.
Cercosporella, 25.
Cereus, 26, 100, 161, 383.
Cerinthodes, 61.
Cetraria, 248.
Chænactis, 69.
Chætopappa, 58.
Chætophora, 119.
Chamæcistis, 59.
Chamæcyparis, 134.
Chamædaphne, 60.
Chamædora, 384.
Chamæraphis, 64, 385.
Chamærhodendros, 59.
Chamæsiphon, 124.
Chaos, 95.
Chaptalia, 59, 266.
Chara, 194, 230, 320, 350.
Cheiranthus, 69.
Cheirolepis, 102.
Chelone, 278.
Chenopodium, 10, 46, 68, 138, 144, 260.
Chiloscyphus, 246.
Chimaphila, 60, 89, 246, 385.
Chiogenes, 271, 335, 349.
Chloris, 99.
Chloropsis, 64.
Chomelia, 58.
Chrosperma, 63, 385.
Chrysanthemum, 10, 45, 146, 151, 242, 260.
Chrysobalanus, 30, 280.
Chrysophyllum, 343.
Chrysopsis, 58, 90,
Chrysopsora, 136.
Chrysosplenium, 261.
Chytraculia, 57.
Chuquiragua, 265.
Cienfugosia, 232.
Cinchona, 32.
Cinna, 336.
Cinnamomum, 95, 332.
Cipura, 235.
Circæa, 182, 241, 344.
Cissus, 86, 383.
Citharexylum, 135.
Citrus, 30.
Cladium, 64.
Cladochytrium, 214.
Cladoderis, 236.
Cladonia, 249, 313.
Cladosporium, 384.
Cladrastis, 103.
Clasterosporium, 198.
Claviceps, 285.
Claviga, 277.
Claytonia, 140, 184, 240, 346, 376.
Clematis, 53, 94, 133, 280, 284, 308, 384.
Clematitis, 53.
Cleome, 140.
Cleomella, 70.
Clethra, 332.
Clibadium, 148.
Clidemia, 279.
Climacium, 24, 181, 248.
Clinopodium, 62.
Clintonia, 181, 201, 245.
Clitoria, 55.
Closterium, 69, 121, 319, 337.
Clypeolum, 162.
Cnicus, 20, 91, 141, 260, 384.
Coccoloba, 62.
Coconeis, 28.
Cocculus, 53.
Cochlearia, 240, 319.
Codiæum, 85. 86.
Coffea, 30.
Coleanthus, 65.
Coleochæte, 118.
Coleosanthus, 58.
Coleus, 86.
Columnea, 235.
Colletotrichum, 85.
Collinsia, 234.
Collomia, 61.
Comatricha, 290.
Combretum, 235.
Coniothyrium, 86.
Conocephalus, 246.
Conomorpha, 235.
Conostegia, 279.
Conothyrium, 257.
Conradia, 61.
Convolvulus, 10, 95, 142.
Conyza, 30.
Copernicia, 97.
Coptis, 184, 239.
Corallodendron, 56.
Corallorhiza, 15, 63, 322.

Cordia, 61.
Cordylanthus, 61.
Coreopsis, 150.
Corethromyces, 233.
Corion, 54.
Coris, 54.
Cornuella, 196.
Cornus, 134, 181, 186, 242, 349.
Cortinarius, 25.
Coryanthus, 138.
Corycarpus, 64, 385.
Corydalis, 53, 69, 271, 385.
Coryneum, 86.
Coscinodiscus, 28.
Cosmarium, 122, 137.
Cosmos, 151.
Cotinus, 79, 103.
Cottea, 99.
Cotula, 151, 242.
Cotyledon, 133.
Coulterella, 53.
Coulterina, 53.
Coulterophytum, 384.
Couroupita, 27, 138.
Cracca, 55, 56, 279.
Crassina, 58.
Crassula, 307.
Cratægus, 28, 95, 140, 195, 295, 391.
Craterospermum, 120.
Crepidotus, 25.
Crepis, 59.
Cruminium, 55.
Cryptanthe, 234.
Cryptanthus, 68.
Cryptogramme, 182, 246.
Cryptometrium, 162.
Cryptotænia, 57, 385.
Cucurbita, 95, 380.
Cunila, 62.
Cuphea, 90, 232, 237, 295.
Cusparia, 235,
Cutleria, 279.
Cyclamen, 86.
Cyclandra, 279.
Cylindrocladium, 258,
Cymatopleura, 28.
Cymopterus, 70.
Cynoches, 133, 137.
Cynodon, 10, 45, 64.
Cynoglossospermum, 61.
Cynoglossum, 143.
Cynometra, 135.
Cypella, 235.
Cyperella, 64.
Cyperites, 332.
Cyperus, 10, 45, 146, 226, 350.
Cypripedium, 86, 88, 323, 387.
Cystopteris, 182, 246.
Cystopus, 83.
Cytisus, 9.

Dactylæna, 235.
Dactylodes, 64.
Dahlia, 10.
Daimonelix, 165.
Dalbergia, 235.
Dalea, 103, 110, 383.
Datisca, 80.
Datura, 144.
Daucus, 143, 298, 344, 385.
Deeringia, 57, 385.
Delphinium, 197, 348, 385.
Dendrographium, 321.
Dendrophthora, 196.
Dentaria, 376.
Deringa, 57.
Deschampsia, 246, 334, 386.
Desmanthus, 345.
Desmodium, 56, 95, 187, 196, 383.
Desmidium, 121.
Diamorpha, 307.
Diapensia, 335.
Diarrhena, 64, 385.
Diasperus, 62.
Diatrype, 321.
Dicentra, 321, 376, 385.
Dichelyma, 317.
Dichodontium, 346.
Diclytra, 53, 69.
Dicranella, 100, 274.
Dicranodontium, 386.
Dicranoweisia, 100, 274.
Dicranum, 189, 247, 392.
Dicraurus, 344.
Dictyanthus, 384.
Didymella, 162.
Didymodon, 79, 162.
Didymopanax, 279.
Didymosphæria, 162.
Dieffenbachia, 85, 86.
Diervilla, 15.
Dimeresa, 276.
Dimeresia, 276.
Diodia, 45, 91, 140, 145.
Dioscorea, 236.
Diospyrus, 235, 268, 332, 343.
Dipetalia, 54.
Diphryllum, 63.
Diplachne, 99.
Diplodia, 87, 257.
Diplophyllum, 257, 270, 299.
Diplostephium, 2.
Dipsacus, 45, 143.
Discopleura, 57.
Distasis, 58.
Ditrichum, 296.
Doassansia, 196.
Docidium, 122.
Dodecatheon, 243.
Dolichogyne, 4.
Dorcadion, 318.
Dortmanna, 59.
Dothidiella, 162.
Draba, 54, 376.
Dracæna, 85.
Drosera, 89, 241, 295.
Drummondia, 24.
Dryadæa, 57.
Dryas, 57, 241.
Drymaria, 345.
Dryopsis, 65.
Dudresnaya, 278.
Dulacia, 285.
Dumorphococcus, 120.
Dumortiera, 99.
Dupatya, 64.
Dyschoriste, 62.

Eatonia, 98.
Echinacea, 45.
Echinocactus, 385.
Echinocereus, 98.
Echinocystis, 27.
Echinopanax, 58.
Echinospermum, 61, 145.
Echites, 235.
Echium, 143.
Eclipta, 58, 149.
Eichorium, 143.
Elæagnus, 86, 174.
Elaterium, 279.
Elatine, 90, 194.
Elemifera, 55.
Eleocharis, 194.
Eleusine, 147.
Elionurus, 99.
Ellisia, 61.
Elvira, 148.
Elymus, 99.
Emerus, 56.
Emex, 68.
Empetrum 245, 335, 336.

Encalypta, 318, 346.
Encelia, 69, 150.
Enterolobium, 56.
Ephelis, 285.
Epidendrum, 98, 277.
Epigæa, 295.
Epipactis, 63.
Epilobium, 183, 184, 261, 335, 346.
Equisetum, 140, 246.
Eragrostis, 99.
Eranthemum, 86.
Eranthis, 53.
Erechthites, 146, 263.
Ereminula, 276.
Erica, 60.
Ericodes, 60.
Erigeron, 2, 10, 29, 94, 138, 145, 196, 234, 242, 384.
Eriocaulon, 226.
Eriochloa, 164.
Eriodendron, 30.
Eriogonum, 17, 68, 346.
Eriogynia, 57, 183, 244.
Eriophorum, 183, 246.
Eriophyllum, 59.
Erithrea, 60.
Eritrichium, 244.
Erodium, 38, 260.
Erophila, 54.
Eryngium, 44.
Erysimum, 9, 54, 69, 196.
Erythræa, 60.
Erythrina, 56.
Erythronium, 376.
Escallonia, 237.
Eschscholtzia, 196, 237.
Esculus, 55.
Euastrum, 122, 137, 319.
Eucalyptus, 30, 235, 342.
Eudorina, 119.
Eugeniodes, 60.
Eupatoriophalacron, 59.
Eupatorium, 1, 59, 90, 128, 136, 384.
Euphorbia, 10, 67, 82, 98, 136, 146, 161, 380, 383.
Eustichia, 257.
Eustichium, 24.
Evax, 193.
Everhartia, 321.
Evonymus, 86.
Eysenhardtia, 103.

Fagopyrum, 62.
Fagus, 25, 30, 152, 349.
Falcata, 56.
Fatsia, 58, 184, 242.
Fevillèea, 56.
Ficus, 85, 86, 235.
Filipendula, 57.
Fimbriaria, 99.
Fimbristylis, 64.
Fissurina, 251.
Fistularia, 61.
Flaveria, 384.
Fontinalis, 98, 317.
Forestiera, 60.
Fossombronia, 99, 293, 300.
Fragaria, 222, 241, 349.
Fragilaria, 27.
Frankia, 171.
Franseria, 46, 59, 196.
Frasera, 196.
Fraxinus, 86, 134, 342.
Frullania, 99, 300.
Fuchsia, 235.
Funkia, 85.
Furcrœa, 345.
Fusarium, 7.

Gærtuera, 59.
Galactia, 278, 383.
Galax, 60.
Galeandra, 345.
Galeopsis, 62.
Galinsoga, 151.
Galipea, 235.
Galium, 74, 182, 242.
Gansbium, 54.
Gaura, 344, 382.
Gaultheria, 59, 271.
Gaylussacia, 59.
Geaster, 321.
Geissolepis, 384.
Gelsemium, 61.
Gemmingia, 63.
Gentiana, 186, 243.
Geranium, 182, 240, 376.
Gerardia, 91, 350.
Gesnera, 345.
Geum, 241.
Gigartina, 246.
Gilia, 61, 70, 93, 94, 193, 196, 244, 260, 381.
Glaucium, 53.
Glaucospora, 346.
Glaux, 53, 243.
Glechoma. 62.
Gleditschia, 377.
Gleditsia, 56, 103.
Gleichenia, 289.
Globifera, 61.
Glœosiphonia, 278.
Glœosporium, 85, 198.
Glyceria, 64, 385.
Glycirrhiza, 138.
Gnaphalium, 148, 243, 335.
Gœthea, 232.
Gomphrena, 62.
Gonatozygon, 133.
Gongora, 162.
Goniopteris, 197.
Goniorrhachis, 135.
Gonium, 119
Gonolobus, 384.
Goodyera, 63, 245, 322.
Gordonia, 54.
Gossypium, 232.
Gouania, 55.
Graphis, 251.
Griffithsia, 67.
Grimmia, 192, 247, 346.
Grindelia, 2, 192, 277, 383.
Guazuma, 95.
Guettarda, 58.
Gutierrezia, 192.
Gymnocladus, 103, 378.
Gymnolomia, 384.
Gymnomitrium, 270.
Gynoxys, 265.
Gyrostachys, 63, 385.
Gyrotheca, 350.

Habenaria, 88, 91, 161, 245, 256, 323, 336, 346, 349, 350, 384.
Hackelochloa, 64.
Halenia, 60.
Halenius, 60,
Hamamelis, 251.
Harpanthus, 269, 300.
Harpidium, 248.
Hedeoma, 45.
Hedera, 86.
Hedwigia, 247.
Hedyosmos, 62.
Hedysarum, 107, 246.
Hedysarodes, 107.
Heimatomyces, 233.
Helenia, 59.
Heleniastrum, 59.
Helenium, 29, 59, 90, 145.
Helianthus, 46, 83. 150, 192, 381, 383.
Helicoma, 321.
Helicomyces, 321.
Helicoon, 321.

Heliotiella, 162.
Heliotropium, 10.
Helotium, 236.
Helleborine, 63.
Helleborodes, 53.
Helxine, 62.
Hemionitis, 134.
Hendersonia. 198.
Henrya, 97.
Hepatica, 376.
Heracleum, 183, 187, 242, 335.
Heritiera, 63.
Herpestis, 61, 193, 194.
Hesperanthns, 70.
Hesperis, 54.
Heteranthera, 64.
Heteromeles, 280.
Heterothalmus, 4.
Heterothecium, 249.
Heuchera, 258.
Hibiscus, 86, 91,.145, 232, 312, 387.
Hicoria, 30, 63, 332.
Hieracioides, 59.
Hieracium, 45, 89, 146, 185, 243, 266, 341, 349, 371.
Hierochloa, 386.
Hierochloë, 89.
Hilaria, 99.
Hippagrostis, 64.
Hippocastaneum, 267.
Hippophoë, 174.
Hirtella, 235.
Hoffmanseggia, 345.
Hohenbergia, 68.
Holodiscus, 57.
Homalocenchrus, 64.
Hordeum, 46.
Hortia, 235.
Houstonia, 344, 346, 385.
Houttynia, 320.
Hydrangea, 85, 344, 385.
Hydrogonum, 60.
Hydrolea, 61.
Hydrophyllum, 198, 376.
Hydrosilicon, 133.
Hylocomium, 248, 275.
Hymenochæte, 236.
Hymenopappus, 59.
Hypericum, 29, 94, 240, 242, 258.
Hypnum, 24, 180, 194, 248.
Hypochæris, 371.
Hypolyssus. 72.
Hypoxis, 376.
Hyptis, 62.
Hyophila, 70.
Hystrix, 64, 385.

Ibidium, 63.
Ichthyomethia, 56, 103.
Ilex, 253, 331.
Ilicioides, 55.
Impatiens, 86, 184, 240, 349, 350.
Indigofera, 55.
Inga, 56, 135.
Inula, 10, 45, 59.
Ionidium, 54.
Ioxylon, 62, 332.
Ipomœa, 45, 86, 142, 233, 384.
Iresine, 86.
Iria, 64.
Iris, 89, 278.
Isoetes, 65, 69.
Isnardia, 57.
Isomeris, 196.
Isopyrum, 69, 258.
Isothecium, 248.
Iva, 46, 83.

Jægeria, 149.
Jatropha, 95.
Jeffersonia, 135.
Jungia, 266.
Juglans, 30, 376.
Juncodes, 64.
Juncus, 245, 293, 309, 334, 336.
Jungermannia, 9, 198, 270, 300.
Juniperus, 134.

Kalmia, 60, 243.
Kantia, 99, 246, 270, 300.
Kelloggia, 157.
Knorria, 159.
Kœllia, 62, 385.
Kœnigia, 244.
Kosteletzka, 55.
Kosteletzkya, 233.
Kraunhia, 56.
Krigia, 58, 385.
Krynitzkia, 94, 193.
Kuhnistera, 56.
Kunzia, 345.

Laboulbenia, 233.
Lachnanthes, 63.
Lachnocladium, 277.
Lacinaria, 59, 385.
Lactuca, 140.
Ladanum, 62.
Læstadia, 2, 86.
Lagenaria. 95.
Lagerstrœmia, 59.
Lamarckia, 64.
Lamium, 146.
Lansbergia, 235.
Lantana, 62.
Laplacea, 30.
Laportea, 62.
Lappula, 61.
Laurophyllum, 343.
Laurus. 95, 232, 235.
Lasianthus, 54.
Latania, 138.
Lathyrus, 94, 210.
Larrea, 69.
Lecanora, 248, 250.
Lechea, 70, 279.
Ledum, 335.
Leersia, 64, 318.
Leguminosites, 343.
Lejeunea, 258, 299.
Leontopodium, 148.
Leonurus, 145, 381.
Lepachys, 30, 383, 385.
Lepargyrea, 62.
Lepidium, 45, 54, 82, 83, 144.
Lepigonum, 240.
Lepidodendron, 159, 197.
Lepidophlois, 159.
Lepidospartum, 196.
Lepidostrobus, 159.
Lepidozia, 246.
Lepismium, 69.
Leptarrhena, 241.
Leptobarbula, 275.
Leptochloa, 64.
Leptogonium, 248.
Leptodontium, 275.
Leptorchis, 63, 385.
Leptosphæria, 85.
Leptostachya, 62.
Leptosyne, 384.
Lerchea. 62.
Lescuræa, 275.
Leskea, 346.
Lespedeza, 297.
Lesquerella, 53, 68.
Leucæna, 103.
Leucobryum, 189.
Leuconymphæa, 53.
Leucothoë, 332.
Liabum, 263.
Liatris, 59, 91, 385.
Libocedrus, 134.

Licania, 139, 235.
Licrophycus, 344.
Ligusticum, 242.
Ligustrum, 98, 381.
Lilium, 233, 278
Limnanthemum, 60.
Limnodorum, 63.
Limonium, 60.
Limosella, 193.
Linaria, 144.
Lindbladia, 320.
Lindera, 62.
Linnæa, 58, 60, 197.
Liochlæna, 99, 270.
Liparis, 87, 90, 321, 385.
Liquidambar, 331.
Liriodendron, 53, 235, 242, 389.
Listera, 63.
Lithocardium, 61.
Lithospermum, 45, 133, 376.
Littorella, 279, 340.
Livistonia, 86.
Loasa, 259.
Lobelia, 59, 79, 374, 385.
Lœflingia, 105.
Lœstadia, 86.
Loiseleuria, 59, 243.
Lomaria, 65.
Lonchocarpus, 135, 332.
Lonicera, 5, 8, 98, 197, 383.
Lopesia, 384.
Lophanthus, 62, 385.
Lophocolea, 346.
Loricaria, 148.
Lotodes, 56.
Lotus, 234, 322, 346.
Ludwigia, 57, 344.
Luetkea, 57, 236.
Luina, 234.
Lupinus, 138.
Lupulus, 55.
Luzula, 64, 245, 336.
Lychnis, 94, 144.
Lyciodes, 60.
Lycopersicum, 380.
Lycopodioides, 65.
Lycopodium, 29, 33, 246, 271, 289, 335, 336.
Lycoseris, 266.
Lycurus, 99.
Lyginodendron, 160.
Lygodium, 350.
Lyonothamnus, 280.
Lysichiton, 184, 245.
Lysiloma, 103.
Lythrum, 258.

Maclura, 62.
Macranthera, 61.
Macrocalyx, 61.
Macrosporium, 198.
Madia, 151, 243, 260.
Magnolia, 30, 331.
Maianthemum, 64, 181, 245.
Malache, 54.
Malachra, 232.
Malapoenna, 62.
Malaxis, 385.
Malva, 46, 55, 143.
Malvastrum, 55.
Malvaviscus, 232.
Malveopsis, 55.
Mamillaria, 57, 387.
Manihot, 95.
Manisurus, 64.
Mapourea, 58.
Maranta, 86.
Marchantia, 259, 270, 277.
Marilaunidium, 61.
Mariscus, 64.
Marrubium, 45.
Marsilea, 65.
Marsilia, 234.
Marsupella, 270.
Martynia, 140.
Masdevallia, 100, 259, 277.
Mastigochytrium, 346.
Matthiola, 58.
Mauchia, 59.
Meadia, 60.
Meconella, 197.
Medica, 56.
Medicago, 9, 56, 138, 143.
Medinillopsis, 23.
Meibomia, 56, 107.
Melampodium, 384.
Melanconium, 198.
Melanthera, 58.
Melanthus, 346.
Melaspila, 251.
Melia, 55.
Melilotus, 9, 56, 45, 138, 209, 387.
Meliola, 157.
Melocactus, 57.
Melosira, 28.
Menispermum, 389.
Mentzelia, 68, 94, 196.
Menyanthes, 140, 244.
Menziesia, 243
Merceya, 275.
Mercurialis, 10.
Merismopedia, 124.
Mertensia, 61, 124, 184, 244, 376.
Mesoneuron, 332.
Mesophæum, 235.
Mespilus, 140.
Metasphæria, 162.
Metiodorea, 235.
Metzgeria, 247, 300.
Miconia, 23, 279.
Micrampelis, 346.
Micranthemum, 61.
Micrasterias, 122, 137.
Micro-Lejeunea, 258.
Micromeria, 244.
Microstylis, 63, 90, 385.
Mikania, 1, 59, 297, 312.
Miltonia, 277.
Mimosa, 135, 279.
Mimulus, 22, 26, 135, 184, 244.
Mitella, 183, 241, 321.
Mnium, 181, 247, 275, 318.
Modiola, 54.
Mollugo, 145, 344, 383.
Monarda, 45, 273, 349.
Moneses, 243.
Monilia, 5.
Monniera, 61.
Monochætum 279.
Monolepis, 68.
Monotropa, 243, 278.
Monstera, 321.
Moorea, 387.
Morelosea, 61.
Morus, 168, 332.
Mosenthinia, 53.
Mucuna, 56, 278, 279.
Muhlenbergia, 99, 164, 386.
Munroa, 99.
Murtughes, 57.
Musa, 30.
Musenium, 57.
Mutisia, 265.
Mylia, 270, 300.
Myrica, 177, 237.
Myriophyllum, 90.
Myrrhodes, 57.
Myrsine, 235.
Myrstiphyllum, 58.

Naias, 194.
Nama, 6.
Nardia, 198.

Nasturtium, 54, 69, 82, 83, 95, 340,
Nathusia, 235.
Navarretia, 61.
Navicula, 28.
Nazia, 64.
Neckeria, 53, 70, 385.
Negundo, 376.
Nelumbo, 31, 350.
Nemopanthes, 55.
Neohenrya, 97.
Neottia, 63.
Nepeta, 62, 86, 144.
Nephroma, 248.
Nerium, 86.
Nestronia, 62.
Nicandra, 61, 385.
Nicotiana, 347.
Nidularia, 68.
Nitella, 194, 230.
Nitzschia, 28.
Nostoc, 124, 200.
Notholæna, 29.
Notylia, 260.
Nummularia, 60.
Nuphar, 239. 286.
Nymphæa, 286.
Nymphodes, 60.
Nyssa, 331.

Obolaria, 58, 60, 197.
Odontopteris, 197.
Œnothera, 68, 81, 143, 193, 197, 344, 385.
Oldenlandia, 384.
Oldhamia, 159.
Oligomeris, 54
Olneya, 103.
Omphalea, 25.
Oncidium, 235, 260.
Onobrychis, 107.
Onoclea, 65, 284.
Ononis, 32.
Onosmodium, 45.
Opegrapha, 250.
Ophiopogon, 86.
Oplismenis, 64.
Opulaster, 57.
Opuntia, 30, 57, 92, 235.
Opizia, 260.
Orchiodes, 63.
Orcuttia, 386.
Oreodaphne, 134.
Oreopanax, 26.
Oryzopsis, 99, 154, 386.
Ornithogalum, 259.
Orthotrichum, 66, 165, 276, 318.
Oscillaria, 24, 75, 124.
Oscillatoria, 24.
Osmorrhiza, 57, 95, 98, 197, 242.
Osmunda, 199.
Ossæa, 274.
Ostrya, 332.
Oxalis, 55, 89, 138, 246, 376, 383.
Oxybaphus, 62.
Oxycoccus, 271.
Oxyria, 244.
Oxytropis, 240.
Oyedæa, 149.

Pachyrhizus, 55.
Pæpalanthus, 64.
Palæocassia, 389.
Palicourea, 58.
Pallavicinia, 99.
Palmifolia, 65.
Pandanus, 86.
Panicularia, 64, 385.
Panicum, 146, 286, 340, 380, 386.
Papaver, 98.
Papaya, 57.
Pappophorum, 99.
Paypayrola, 235.
Parkinsonia, 103.
Parmelia, 248, 260.
Parnassia, 241.
Parthenium, 66.
Pasithea, 347.
Paspalum 99.
Passiflora, 86, 143, 237, 323, 345.
Pastinaca, 143, 376.
Pavia, 55.
Pavonia, 54, 232.
Pawia, 55.
Pecopteris, 197.
Pedicularis, 187, 244.
Pelargonium, 17, 86.
Pellæa, 29, 383.
Pellia, 247, 270.
Peltigera, 248.
Penium, 69.
Pentagonia, 59, 61.
Pentagonium, 56.
Pentagonocarpus, 55.
Penthorum, 306.
Penstemon, 15, 89, 278, 350.
Peperomia, 48, 254, 347.
Pericularia, 83.
Perityle, 233.
Perezia, 266, 298, 384.
Peronospora, 81, 136, 199, 278.
Persea, 95, 332.
Pestalozzia 198.
Petalostemon, 56.
Petasites, 243.
Peucedanum, 70.
Phacelia, 71, 196, 384.
Phacidium, 343.
Phalaris, 99, 164, 386.
Phaseolus, 56, 206, 209, 298.
Phegopteris, 182.
Philadelphus, 71, 344.
Philibertia, 383.
Philonotis, 70, 247.
Phleum, 246, 336, 382.
Phlox, 60, 95, 225, 376.
Phœnix, 347.
Phoma, 257.
Phryma, 62.
Phrymium, 85, 86
Phylladora, 236.
Phyllanthus, 62.
Phyllitis, 65.
Phyllocactus, 260, 387.
Phyllodium, 107.
Phyllosiphon, 322.
Phyllosticta. 25, 85, 198, 232.
Physalis, 102, 147.
Physalodes, 61, 385.
Physalospora, 100.
Physaria, 53, 68.
Physarium, 54.
Physocarpus, 57.
Picea, 134, 182, 245, 334.
Pilea, 63, 382.
Pilocarpus, 235.
Pilocereus, 387.
Pilophorus, 249.
Pilotrichella, 70.
Pilularia, 65.
Pimemta, 95.
Pinguicula, 31.
Pinus, 11, 31, 71, 100, 136, 165, 168, 197, 203, 253,
    285, 297, 343, 387.
Piper, 47. 254.
Piptadenia, 135.
Piscidia, 56, 136.
Pisonia, 137.
Pisum, 210.
Pitcairnia, 66.
Pithecolobium, 56, 103, 199
Pithium, 135.
Pittiera, 279.
Pittosporum, 86.

Placodium, 249.
Plagiobothrys, 234, 346.
Plagiochila, 99, 198, 270, 289, 386.
Plagiothecium, 248.
Planera, 332.
Plantago, 46, 145, 260, 332, 349, 388.
Plasmodiophora, 171, 195, 383.
Plasmopara, 83.
Platanus, 285, 379.
Platygerium, 9.
Platymiscium, 135.
Platystemon, 197.
Pleospora, 298.
Pleurolobus, 107.
Pleurosigma, 28.
Pleurotus, 25.
Pleurozium, 248.
Pluchea, 4, 91.
Poa, 246, 261.
Podophyllum, 376.
Podostemon, 89.
Pogonatum, 248.
Pogonia, 88.
Polia, 235.
Polemonium. 34, 224.
Polycarpon, 9.
Polygala, 32, 50. 133, 280, 350.
Polygonum, 10, 63, 68, 91, 144, 161, 183, 244, 259. 351, 385.
Polymnia, 148.
Polypodium, 25, 236, 246, 283, 386.
Polystictus, 162.
Polytrichum, 70, 100, 248.
Pombalia, 54.
Pongamia, 332.
Populites, 389.
Populus, 134, 244, 261, 331, 376.
Porella, 99, 198, 247.
Porliera, 237.
Porophyllum, 151, 384.
Porotrichum, 70.
Portulaca, 46, 138, 146, 380.
Posadæa, 71.
Potamogeton, 194, 340.
Potentilla, 183, 196, 241, 335, 349, 350.
Poterium, 91, 241.
Pottia, 275.
Prantleia, 68.
Prasiola, 347.
Prenanthes, 231, 243, 335
Pritchardia, 64.
Prosartes, 261.
Prosopis, 29, 103, 383.
Protæoides, 235.
Protococcus, 119.
Proustia, 266.
Prunus, 134, 136, 276, 280, 349, 376, 390.
Pseva, 60, 385.
Pseudospora, 79.
Psilostrophe, 59.
Psoralea, 56, 91, 94.
Psychotria, 58, 235.
Psychotrophum, 58.
Pterinodes, 65.
Pteris, 182, 246, 260.
Pterocaulon, 148.
Pterophyllum, 343.
Pterospora, 243.
Pterosporopsis, 60.
Ptilidium, 270.
Ptilimnium, 57.
Ptilonella, 276.
Ptychosperma, 86.
Puccinia, 198, 232, 236.
Pucciniosira, 136.
Pulsatilla, 231.
Purshia, 345.
Pycnanthemum, 45, 62, 385.
Pyrenochæta, 257.
Pyrenophora, 162.
Pyrola, 89, 183, 243.
Pyrus, 157, 162, 166, 280, 376.

Quercus, 30, 31, 104, 134, 135, 137, 140, 162, 250, 274, 300, 309, 332, 346, 379. 383, 388.

Racomitrium, 247.
Radiopalma, 133.
Radula, 99.
Raminium, 63.
Ramularia, 25, 83.
Ranunculus, 93, 146, 187, 196, 219, 231, 234, 239, 246, 259, 284, 297.
Raphanus, 82, 145.
Ravenelia, 232.
Razoumofskya, 197.
Reinechia, 86.
Reseda, 382.
Restrepia, 236.
Rhabdochloa, 64.
Rhamnites, 389.
Rhamnus, 235.
Rhinanthus, 61, 244.
Rhipsalis, 103, 261.
Rhizobium, 205.
Rhizocephalum, 374.
Rhizæolenia, 67.
Rhizophora, 29, 346, 387.
Rhodea, 86.
Rhododendron, 59, 140, 335.
Rhodostachys, 68.
Rhus, 55, 79, 103, 136, 322.
Rhynchospora, 71, 233.
Ribes, 94, 157, 241, 344, 376.
Richardia, 58, 86.
Richardsonia, 58.
Ricinocarpus, 62.
Ridania, 385.
Robinia, 32, 103, 136, 210.
Romanzoffia, 184, 244.
Romneya, 166, 261.
Rosa, 32, 157, 161, 241, 349.
Rosellinia, 203.
Rostrupia, 277.
Rothia, 59.
Rottboellia, 64.
Roubieva, 10.
Rubus, 89, 98, 166, 181, 241, 383, 385.
Rudbeckia, 45, 95, 146, 388.
Rudgea, 58, 235.
Rumex, 138, 142, 193, 236, 244, 260.
Rusbya, 72.
Russula, 161.

Sabadilla, 63.
Sabazia, 384.
Sabbatia, 64, 91, 350.
Saccharomyces, 25.
Saccorhiza, 72.
Sagina, 91, 240.
Sagittaria, 194.
Salicornia, 62, 68, 91, 322.
Salix, 244, 335, 343.
Salmea, 150.
Salvia, 278, 279.
Salvinia, 65.
Sambucus, 86, 181, 197, 242, 344, 346, 385.
Samolus, 91.
Sanguinaria, 258.
Sapindus, 235, 343, 383.
Saponaria. 9, 142, 381
Sapota, 30.
Sapotacites, 343.
Saprolegnia, 135.
Sarcobatus, 196.
Sarcodes, 60.
Sarcodum, 60.
Sarracenia, 32, 87.
Saxifraga, 68, 182, 196, 241.
Scabiosa, 341, 380.
Scapania, 247, 270.
Scenedesmus, 119.

Schedonardus, 99, 192.
Schinzia, 171, 208.
Schistochila, 346.
Schizonema, 28, 57.
Schlectendalia, 59.
Schmidtia, 65.
Schœnanthum, 65.
Schœnocaulon, 63.
Schollera, 64.
Schwackæa, 23.
Schweinitzia, 60.
Scirpus, 91, 233, 336.
Sclerolobium, 135.
Scleropogon, 99.
Sclerospora, 83.
Scolecotrichum, 198.
Scolithus, 168.
Scolopendrium, 68.
Scoparia, 61.
Scoria, 63.
Scorpiurus, 9.
Scutellaria, 385.
Sedum, 45, 141, 241, 307.
Selaginella, 65, 271, 289.
Selaginoides, 65.
Selinum, 242.
Selloa, 59.
Senecio, 138, 183, 243, 264.
Septomyxa, 25.
Septoria, 32, 82, 85, 198.
Sequoia, 64, 322, 388.
Sertula, 56.
Sesban, 56.
Sesleria, 304.
Sesuvium, 57.
Setaria, 64, 83, 147, 164, 385.
Seymeria, 61, 95.
Shepherdia, 62, 174.
Sherardia, 9.
Shultzia, 60.
Sibbaldia, 241.
Sida, 340.
Sideroxylon, 30.
Siegesbeckia, 149.
Sieglingia, 65, 385.
Sigillaria, 159.
Sigillariopsis, 160.
Silene, 183, 234.
Silphium, 45.
Silybum, 46, 138, 243.
Simaruba, 343.
Siphocampylus, 104, 372
Sisymbrium, 9. 54, 82, 83, 95, 144.
Sisyrinchium, 63, 235.
Sium, 89.
Sloanea, 30.
Smilacina, 63, 321.
Smilax, 98, 100, 196, 323.
Solandra, 137.
Solanum, 10, 46, 87, 102, 144, 235, 277, 383.
Solidago, 2, 129, 243, 312, 335, 381, 385.
Sonchus, 138, 145, 243, 260, 371.
Sophora, 103.
Sorbaria, 57.
Sorghum, 65, 380.
Spathyema, 64.
Specularia, 59.
Speisia, 56.
Sphæralcea, 55.
Sphæria, 162.
Sphæroma, 55.
Sphærophorus, 249.
Sphæropsis, 198
Sphærozoma, 69, 121.
Sphagnum, 195, 348.
Sphenophyllum, 197.
Sphenopteris, 344.
Spicant (a), 65.
Spilanthes, 58, 150, 384.
Spinacea, 82.
Spiræa, 72, 87, 236, 241, 348.
Spirangium, 160.
Spiranthes, 9, 63, 245, 278, 385.
Spiraxis, 160.
Spirogyra, 75, 123.
Spirophyta, 159.
Spirostachys, 62, 68.
Sporobolus, 99, 164.
Stachys, 244, 279.
Stanhopea, 261.
Stanleya, 94.
Staphylea, 267.
Statice, 60.
Staurastrum, 122, 137, 319.
Stegonospora, 198.
Steironema, 60.
Stellaria, 54, 57, 146, 240, 259.
Stellularia, 54.
Stemodia, 61.
Stemodiacra, 61.
Stenosiphon, 57.
Stenosiphonium, 57.
Sterculia, 343.
Stereocaulon, 247.
Stevia, 87.
Sticta, 180, 248.
Stictis, 198.
Stigmaria, 159.
Stipa, 99, 154, 386.
Stizolobium, 56.
Streptanthus, 54, 68, 234.
Streptocalyx, 68.
Streptopus, 181, 182, 245.
Stylocline, 196.
Styrax, 235.
Suæda, 62.
Surirella, 28.
Sweetenia, 30.
Sweetia, 135.
Symphoricarpus, 15, 242.
Symplocarpus, 184.
Symplocos, 60, 184.
Synandrospadix, 261.
Syndesmon, 385.
Synedra, 28.
Synphoranthera, 104.
Synthetospora, 258.
Syringa, 376.

Tagetes, 151.
Talauma, 168.
Talinum, 383.
Taphrina, 5.
Taraxacum, 15, 142, 243.
Taxodium, 261.
Taxus, 7, 134, 261.
Tecoma, 61.
Tellima, 183, 241.
Tephrosia, 56.
Terminalia, 237.
Ternatea, 56.
Terpsinoe, 28.
Tessaria, 148.
Tetragonanthus, 60.
Tetralix, 60.
Tetranthera, 62.
Tetraphis, 247.
Tetraspora, 119.
Thalictrum, 98, 197.
Thalysia, 65.
Thelypodium, 68, 95.
Theobroma, 95.
Therofon, 57, 385.
Thinfeldia, 235, 344.
Thorea, 236.
Thrinax, 104.
Thyrsanthema, 59.
Thuja, 7, 134, 245.
Tiarella, 183.
Tibouchina, 279.
Tigridia, 384.
Tilia, 268.

Tillæa, 68.
Tillandsia, 33, 66, 261, 279.
Tinus, 60.
Tissa, 54, 91, 234.
Tithonia, 62, 384.
Tofieldia, 63, 245.
Topobea, 279.
Tounatea, 135.
Touroulia, 138
Tovara, 63.
Tovaria, 63.
Toxicodendron, 55.
Tradescantia, 90, 138, 384.
Tragacantha, 54.
Tragus, 64.
Triactina, 307.
Tribulus, 9.
Trichlora, 64.
Trichloris, 64, 99.
Tricholoma, 25.
Trichomanes, 138.
Trichospira, 150.
Trichostelium, 70.
Trichostomum, 275.
Tridax, 151.
Trientalis, 184, 243.
Trifolium, 9, 209, 234, 240, 258.
Triglochin, 246.
Trillium, 168.
Triodia, 65, 91, 99, 385.
Triplaris, 343.
Triplasis, 91.
Tripsacum, 64, 131, 164.
Tripterocladium, 7, 8.
Trisetum, 99, 386.
Triteleia, 348.
Tritellaria, 234.
Trixis, 266.
Tropæolum, 298.
Tropeolum, 232.
Troposporium, 321.
Troximon, 58, 243.
Tryblidiella, 198.
Tsuga, 231, 281.
Tulipifera, 53.
Tupa, 374.
Tussilago, 140.
Tylimanthus, 198.

Ulmaria, 57.
Ulmus, 30, 268, 332, 376.
Ulota, 168, 247, 318.
Ulothrix, 278.
Umbellularia, 281.
Ungnadia, 383.
Unifolium, 64.
Uragoga, 58.
Uraspermum, 57.
Urera, 232.
Urocystis, 277.
Uromyces, 97, 235.
Urospermum, 58.
Urticastrum, 62.
Usnea, 180.
Ustilago, 95.
Utricularia, 89, 91, 194.
Uvifera, 62.

Vaccinium, 140, 181, 245.
Valeriana, 183, 223, 242, 384.
Valerianella, 242.
Valsaria, 162, 198.
Vaucheria, 75, 119.
Veratrum, 183, 245, 312.
Verbascum, 10, 143, 260.
Verbena, 45, 98, 193, 381.
Verbesina, 70, 150, 384.
Vernonia, 58, 67, 383.
Veronica, 98, 133, 244.
Vesicaria, 53.
Vexillum, 159.
Viburnum, 98, 181, 235, 242, 331.
Viburnites, 389.
Vicia, 9, 45.
Vigna, 384.
Viguiera, 149, 233.
Villanova, 151.
Vinca, 87.
Viola, 82, 89, 240, 376, 384.
Vitis, 31, 331, 380.
Vitex, 30.
Volvulus, 61.
Vriesia, 262.

Wahlenbergia, 374.
Walchia, 197.
Waluewa, 262, 277.
Washingtonia, 64, 160.
Webera, 70, 100, 247.
Wedelia, 149.
Werneria, 265.
Williamsonia, 160.
Willoughbya, 59.
Wistaria, 56.
Wittmackia, 68.
Woodwardia, 89.
Wulfia, 149.

Xanthidium, 122, 319.
Xanthium, 10, 46, 138, 144, 149.
Xanthocephalum, 346, 384.
Xeræa, 62.
Xuarezia, 61.
Xypherus, 56.
Xyris, 35, 260.

Yucca, 261, 278, 324.

Zaluziankya, 65.
Zamia, 196.
Zea, 65, 380.
Zexmenia, 149, 233.
Zinnia, 58.
Zygia, 56.
Zygodon, 275, 392.
Zygopetalum, 324.

The subscriptions to Vol. XIX, BULLETIN, and Vol. III, MEMOIRS are now due.

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CONTENTS:

PAGE.
An Enumeration of the Plants collected by Dr. H. H. Rusby in South America—XIX.: *N. L. Britton* 1
Notes upon *Monilia fructigena*, Pers., and Spore Germination: *Byron D. Halsted* .. 5
Some Notes on *Tripterocladium leucocladulum*, Muell.: *John B. Leiberg* 7
Ballast Plants at South Bethlehem, **Penn.: *Thos. C. Porter*** 9
Notes on the Development of Conidia-Bearers in *Acrostalagmus*, Corda. (Plate CXXIII): *Conway MacMillan* 10
Some Duplicate Binomials: *Conway MacMillan* 15
Comparison of the Sullivant Catalogue of the Plants of Franklin County, Ohio, with the List of 1891 by Selby and Craig: *W. R. Lazenby* 16
The Host-Plants of *Aphyllon fasciculatum*: ***E. J. Hill*** 17
An Economic Mulberry: *Geo. B. Sudworth*. 21
BOTANICAL NOTES.—**Sweet Potato Blossoms: *Byron D. Halsted*; *Mimulus moschatus***, Dougl. in New York: *J. H. Wibbe*. 22

PAGE.
REVIEWS OF FOREIGN LITERATURE.—Monographiæ Phanerogamarum, Vol. VII, **Melastomaceæ; An Enumeration of** all the Species of Musci and Hepaticæ recorded from Japan; *Oscillatoria* or ***Oscillaria?*** 23
RECENT AMERICAN BOTANY.—Annual Report of the State Botanist of New York; **Catalogue of Plants of Santa Cruz** County, California; Colors of Flowers; Colors of Leaves; Diatoms: Their Life-History and Classification; Flora of the Cape Region of Baja California; Index **to Economic Products of the Vegetable** Kingdom in Jamaica; European Plants introduced into the Valley of the Minnesota; Notes on the Flora of Nova Scotia; The Genus *Polygala* in North America; The Action of Bacteria **on the Rapid Souring of Milk during** Thunder Storms, and briefer Notices.. 25
PROCEEDINGS OF THE CLUB 3

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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XIX.] New York, January 15, 1892. [No. 1.

An Enumeration of the Plants collected by Dr. H. H. Rusby in South America, 1885-1886.—XIX.

(Continued from vol. xviii, page 334.)

EUPATORIUM THYMIFOLIUM, spec. nov. § Praxelis. Suffruticosum, ramosum, 7-8 dm. altum; ramis gracilibus, ascendentibus minute pubescentibus; foliis ovatis ovalibusque, integris, obtusis, supra scabris, intense viridibus, subtus punctatis, pubescentibus, 8-15 mm. longis, 3-6 mm. latis, breviter petiolatis; capitulis gracile pedicellatis, campanulatis, 1 cm. longis; involucri squamis 2-3-seriatis, obtusis, minute pubescentibus, interioribus linearibus, exterioribus brevioribus, lanceolatis, pappi setis griseis, flexuosis; acheniis linearibus, infra attenuatis.

Ingenio del Oro, 10,000 ft. (1747). Related to *E. erythrolepis*, Sch. Bip. based on Mandon's 261.

Eupatorium dendroides, Spreng. Syst. Veg. iii. 466. Yungas, 4,000 ft. (1580).

Mikania scandens (L.), Willd. Sp. Pl. iii. 1743. Yungas, 6,000 ft. (1645); Guanai, 2,000 ft. (1644); Mapiri, 5,000 ft. (1647). Junction of the rivers Beni and Madre de Dios (1646).

Mikania cordifolia (L.), Willd. Sp. Pl. iii. 1746 (*M. gonoclada*, DC.). Near La Paz, 10,000 ft. (1648); Guanai, 2,000 ft. (1649).

Mikania psilostachya, DC. Prodr. v. 190. Yungas, 6,000 ft. (1702); Mapiri, 2,500 ft. (1701; 1703).

Mikania Lindbergii, Baker, in Mart. Fl. Bras. vi. Pars. ii. 233. Yungas, 6,000 ft. (1736).

Mikania angularis, Humb. & Bonpl. Pl. Æquinoc. ii. 87, t. 106. Yungas, 4,000 ft. (1740).

Mikania Hookeriana, DC. Prod. v. 195. Mapiri, 5,000 ft. (1738). The same as Matthew's No. 1368 from Peru.

Mikania amara (Vahl.), Willd. var. *Guaco* (Humb. & Bonpl.), Baker in Mart. Fl. Bras. vi. Pars. II. 237. Junction of the rivers Beni and Madre de Dios (1650). The same as Lechler's No. 2477 from Peru.

Mikania rufa, Benth. Pl. Hartw. 201. Unduavi, 8,000 ft. (1737).

Grindelia glutinosa (Willd.), Dunal. Mem. Mus. Par. v. 49. Tacna, Chili (1612).

Solidago polyglossa, DC. Prodr. v. 332. Yungas, 6,000 ft. (1629).

Læstadia Lechleri, Wedd. Chlor. And. i. 184. (*Lagenophora Lechleri*, Sch. Bip. Bonplandia, 1856, 54, name only). Unduavi, 8,000 ft. (2667).

Aster marginatus, H.B.K. Nov. Gen. iv. 91. Sorata, 10,000 ft. (1659).

Aster marginatus, var. *acaulis*, Sch. Bip. Bull. Soc. Bot. France, xii. 81, name only. Sorata, 13,000 ft. (1718).

Aster divaricatus, T. & G., var. *graminifolius* (Spreng.), Baker in Mart. Fl. Bras. vi. Pars. III, 22 (*A. exilis*, Ell. var. *australis*, A. Gray). Near La Paz, 10,000 ft. (1712). Among the numerous names which have been applied to this plant I am unable to ascertain definitely which is the oldest available one. I am following Mr. Baker in the name I here adopt, but am of the opinion that the plant is specifically distinct from the North American.

Aster Vahlii (Gaud.) H.,& A. Comp. Bot. Mag. ii. 49. Sorata, 10,000 ft. ? (2720). Slightly different from the Patagonian specimens. Locality and determination uncertain.

Diplostephium Mandoni, Sch. Bip. Bull. Soc. Bot. France, xii. 81, name only. Unduavi, 8,000 ft. (1660).

Erigeron Pazensis, Sch. Bip. Bull. Soc. Bot. France, xii, 80, name only. Near La Paz, 10,000 ft. (1662; 1663).

Erigeron lanceolatum, Wedd. Chlor. And. i. 193, ex. descr. Yungas, 6,000 ft. Sorata, 8,000 ft. (1661).

Erigeron linifolium, Willd. Sp. Pl. iii. 1955. Near Valparaiso, Chili (2722).

Erigeron Canadense, L. Sp. Pl. 1211. (?) Near La Paz, 10,000 ft. (1666).

Erigeron Bonariense, L. Sp. Pl. 1211. Junction of the Rivers Beni and Madre de Dios (1664). Unduavi, 8,000 ft. (1665).

Erigeron floribundus (H.B.K.), Sch. Bip. Bull. Soc. Bot. France, xii. 81. Sorata, 10,000 ft. (2713). The same as Mandon's 218, Herb. Kew.

Erigeron spiculosum, H. & A. Bot. Beechey, 32. Near Valparaiso, Chili (1667).

Erigeron hieracioides, Wedd. Chlor. And. i. 194. Sorata, 10,000 ft. (2717); 13,000 ft. (2716).

Erigeron rosulatum, Wedd. Chlor. And. 193. Sorata, 13,000 ft. (1616). Possibly distinct, as Dr. Rusby's specimens are more silvery pubescent than Mandon's 224, so named by Schultz.

Conyza Chilensis, Spreng. Nov. Prov. 14. Near Valparaiso (2513).

Baccharis sagittalis, DC. Prodr. v. 425. Near Valparaiso, Chili (1563).

Baccharis genistelloides, Pers. Syn. ii. 425. Unduavi, 8,000 ft. (1564).

Baccharis retusa, DC. Prodr. v. 412. Yungas, 6,000 ft. (1572.)

Baccharis cassinoides, DC. Prodr. v. 412. Yungas, 6,000 ft. (1570).

Baccharis riparia, H.B.K. Nov. Gen. iv. 65. Yungas, 4,000 ft. (1571); near La Paz, 10,000 ft. (1573).

Baccharis floribunda, H.B.K. Nov. Gen. iv. 64, t. 325. Unduavi, 8,000 ft. (1583).

Baccharis Radin, Ph Linn. xxxiii. 146. Tacna, Chili (1586).

Baccharis trinervis (Lam.) Pers. Syn. ii 423. Yungas, 6,000 ft. (1575; 1574); Mapiri, 5,000 ft. (1576).

Baccharis salicifolia (R. & P.) Pers. Syn. ii. 425. Reis, 1,500 ft. (1584).

Baccharis serrulata (Lam.), Pers. Syn. ii. 423. Near Valparaiso, Chili (1668).

Baccharis glutinosa, Pers. Syn. ii. 425. Near Valparaiso, Chili (1561).

Baccharis scandens (R. & P.), Pers. Syn. ii. 424. Sorata, 10,000 ft. (1585).

Baccharis alpina, H.B.K. Nov. Gen. iv. 48. Sorata, 13,000 ft. (1632).

Baccharis microphylla, H.B.K. Nov. Gen. iv. 53. Near La Paz, 10,000 ft. (1581); Yungas, 6,000 ft. (1566); Sorata, 8,000 ft. (2614).

Baccharis microphylla, H.B.K. var. *linearifolia*, Wedd. in Bull. Soc. Bot. France xii. 81. Sorata, 8,000 ft. (1577).

Baccharis dracunculifolia, DC. Prodr. v. 421. Yungas, 4,000 ft. (1568); Unduavi, 8,000 ft. (1569), the latter a narrow-leaved form.

Baccharis aphylla, DC. var. *Boliviensis*, Sch. Bip. Bull. Soc. Bot. France, xii. 81. Unduavi, 8,000 ft. (1567).

Baccharis Pingræa, DC. Prodr. v. 420. Near Valparaiso, Chili (1562).

Baccharis rosmarinifolia, H. & A. Bot. Beechey, 30. Valparaiso, Chili (1560).

Baccharis eupatorioides, H. & A. Journ. Bot. iii. 122. Valparaiso, Chili (1559).

Baccharis spartea, Benth. Sorata, 8,000 ft. (1587).

Baccharis hemiprionoides, Buck., fide Sch. Bip. Bull. Soc. Bot. France, xii. 81. Near La Paz, 10,000 ft. (1578). The same as Mandon's 186.

Baccharis pulchella, Sch. Bip. Bull. Soc. Bot. France, xii. 81, name only. Sorata, 8,000 ft. (1746).

Baccharis, resembling *B. cassinefolia*, DC., but stem densely pubescent above. Probably an undescribed species. Mapiri, 10,000 ft. (1579).

BACCHARIS HETEROTHALMOIDES, spec. nova. Fruticosa, erecta, ramosa, 10–16 cm. alta; ramulis gracilibus, angulatis, glabris; foliis lineari-subulatis, rigidis 1–2 cm. longis, ½ mm. latis; capitulis foeminis terminalibus, solitariis, pedunculatis, 1 cm. altis; involucrum 3–4–seriale, squamis lanceolatis, acuminatis, ½ mm. latis; receptaculo plano, punctato; achenia striata, linearia; pappus sub 2–serialis, scaber.

Yungas, 4 000 ft. (1709).

Baccharis ? Unduavi, 8,000 ft. (1727).

Heterothalmus Boliviensis, Wedd. Chlor. And. i. 179, t. 31 A. Near La Paz, 10,000 ft. (1698).

Dolichogyne (?) Unduavi, 8,000 ft. (1711).

Pleuchea odorata (L.), Cass. Dict. 42, 3. Yungas, 4,000 ft. (1726). Same as Mandon's 206.

Notes Upon Monilia fructigena, Pers. and Spore Germination.*

By Byron D. Halsted.

During the middle of last May the writer brought a quantity of Cherry Rot fungus (*Monilia fructigena*, Pers.) from Mississippi, where he gathered it upon the excrescences of a wild plum caused by *Taphrina pruni*. At that time the cultivated cherries in New Jersey were about the size of peas, and limbs bearing the fruit were placed in tall glass dishes containing water and covered with high bell jars. The fruit of one jar was inoculated with the Mississippi *Monilia*, and after forty-eight hours there was a fine supply of the fungus covering the fruit, while the corresponding jar, with fruit untreated, ripened in due time, the cherries free from the decay.

It is with this out-of-season laboratory supply of *Monilia* that the following experiments were made. It was soon determined that the *Monilia* spores were particularly well adapted for the study of germination. In distilled water, at ordinary temperatures, they quickly send out the single germ-tube, and nearly always at one side of the oval hyaline spore. It requires from one to two hours for the production of a tube of a length exceeding that of the spore. In some cases, after five hours the tube was five to ten times the diameter of the spore. Inoculations were easily made upon green and ripe tomatoes, and various other vegetable substances, all demonstrating that this species of fungus is not confined to the stone fruits, where, however, it does its greatest damage; but will grow upon a wide range of organic compounds. Comparative tests were, however, made in pure cherry juice and that of tomato, for example, and it was shown that the rate of development was about three times as fast upon cherry as tomato juice. Comparative tests were also made between spores in pure water and those in cherry juice. While they grew well in the distilled water, the rate was greatly augmented by the cherry juice, and in forty hours there was a fine crop of spores, borne upon stalks, rising above the cherry juice, while no spores had been produced in the glass-slip well containing only the water.

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* Read before Botanical Section of Association of American Agricultural College and Experiment Stations at Washington meeting, Aug. 15, 1891.

Of more interest were the results obtained by testing the action of fungicides. The substance tested was the ammonical carbonate of copper compound, and of various strengths, beginning with the strongest; that is, three ounces of the carbonate of copper to one quart of ammonia. By this the spores were killed, as also by the half, fifth and twentieth strength. An extreme dilution was then substituted, namely, a one per cent. strength of the fungicide as used for spraying grapes, etc.; that is, one part of the ordinary vineyard strength was added to ninety-nine of pure water, which gave a liquid that contained so little of copper as to require a most delicate chemical test to detect its presence. In such a solution the spores would not germinate, but after several days, when the spores were washed five times and placed in pure water, they grew slowly. In order to carry the test a step farther, slides with pit-cells were arranged, with pure water in each, but into alternate ones a small bit of thoroughly polished copper foil was dropped, the piece being in area equal to the lead at the end of a Faber pencil. That the presence of this minute amount of metallic copper should prevent the germination of the spores was surprising, and only after many trials was the fact accepted. In only one case, in a score or more, was any spores with the copper found with tubes, and in this they had probably formed before the sowing was made. In no instance was there any failure of the spores to grow in the check-cells with pure water only. That there might be no chance of any oxide of copper or other soluble compound being present, the foil was thoroughly scoured and rubbed to a bright polish. After the bit of copper was removed and the water changed, the spores would sometimes germinate, the degree of activity depending somewhat upon the length of time they had been held in check.

If now in place of pure water in a fresh preparation a percentage of cherry juice is added to the slide-well, the spores grow, the rate depending upon the amount of stimulating fluid added. A point could doubtless be reached at which the action of the nourishing fluid would just equal that of the copper, and the spore would remain alive and inactive indefinitely.

While at first sight there does not seem to be any practical bearing for these results, upon a further consideration it may teach the truth that fungicides, as at present employed, are far stronger than they may need to be. If a bit of metallic copper in pure water will hold its own weight, or many times that, of spores inactive, it seems likely that the time has come to try a weaker solution of copper.

Since the above was written opportunity has offered to test the spores of a species of *Fusarium* and those of *Cercospora Apii*, the celery blight, both of which germinate with remarkable rapidity in water. When surrounded with their congenial food, that is, an extract of the host-plant, the rate over that of pure water is augmented many times. When copper is added to the water the spores fail to germinate, or in short, the results are the same as those reported for *Monilia*.

Similar experiments have been made with metallic zinc, but even when the spores were literally surrounded by the granulated metal they grew with vigor. A powdered form of metallic zinc was also used, and even in abundance had no retarding effect.

Some Notes on Tripterocladium leucocladulum, Muell.

As already noted in the BULLETIN, xviii. 55, this species, but once before found in fruit, has again been collected fertile.

In April, 1890, we first observed it, depending in long, wide festoons, sterile, from shelving granite ledges along the shores of Lake Pend d'Oreille, Idaho; a month later, up a cañon, we found it again, abundantly fertile, growing very luxuriantly in large, compact masses, on ledges of dolomite as well as on the trunks and branches of *Taxus brevifolia* and *Thuya gigantea.* Last spring we met it again, fertile, on ledges of porphyritic-granite.

As is the case with most of the mosses here, it fruits at any season of the year, all depending upon the rainfall, but most abundantly during the winter when covered by four to six feet of snow.

The species varies greatly in its mode of branching, leaves, capsule, length of pedicel and size of plants. Typically, the primary stem is long, creeping, very slender, brown, of a horny consistency and sparsely beset with very small squamiform leaves. From it arises long, slender flagelliferous branches 8-15 cm. long, and shorter and more robust ones 4-6 cm. in length. The flagelliferous branches are mostly irregularly branching, sometimes quite simple and exceedingly attenuated. The leaves on them are very closely appressed and at frequent intervals tufts of long radicles are produced. They usually bear numerous female buds, the archegonia of which seldom develop into spore-bearing capsules.

The other variety of branches arising from the primary stem is coarse, stout, sub-pinnately branching with large leaves more or less spreading. They are not commonly produced into flagella, and are densely beset with female non-radiculose buds. By reason of the squarrose tips of the perichætial leaves, these buds are quite conspicuous, resembling little burs.

The Manual says as to inflorescence, "flowers monœcious;" "pseudo-monoicus," would be more correct. We find male buds sparingly on the stems that bear archegonial inflorescence, but the antheridia in these buds I have not yet found otherwise than abortive.

The perfect male buds are developed on separate stems, (plants) ? are found in the axils of the leaves and as terminations of short lateral branches. This latter condition is only apparent, not real, for careful dissection shows that the stem is always slightly prolonged beyond the bud, thus maintaining its lateral position. Very few of these short bud-bearing branches develop beyond the point where the first bud is formed, except as noted above; usually several buds are produced at this place, or a rosette of leaves, or the branch dies. The buds contain two to three oblong antheridia $\frac{170}{70}=\frac{190}{90}$ mic., with few paraphyses.

The capsule varies from oval to cylindrical, erect, cernous or sometimes pendent, constricted under the orifice or not, broad-mouthed or with a very small orifice. Manual says "teeth latticed;" this is only the case when the operculum is first lifted. The trabecula are seen joined, very delicately, soon, however, breaking apart. The leaves on the fertile stems are mostly ovate, narrowed into a long or short accumination; on the flagella the leaves assume a more elongated outline and the point becomes longer.

I have not seen the types from which the characters of *Tripterocladium leucocladulum* were drawn but, fide E. G. Britton, they compare with my No. 241 of Idaho mosses, the species referred to above. Upon comparison with No. 469 of Macoun's Canadian mosses, *Platygyrium rupestre*, Kind., later *Tripterocladium rupestris*, it is impossible to avoid the conclusion that Macoun's No. 469 merely represents the flagelliferous state of the plant, with more elongated and longer acuminate leaves than the fertile plant characterized in the Manual.

JOHN B. LEIBERG.

Ballast-Plants at South Bethlehem, Penn.

Near the iron furnaces of that inland city are large heaps of ores brought over the seas as ship-ballast from Spain, Africa, and the West Indies, and transported thither by railroad from New York. On these heaps, as usual, foreign plants have appeared, a few of which were first observed some years ago by Messrs. C. N. Lochman and E. A. Rau, but during the past two seasons quite a number were collected by Mr. Robert G. Bechdolt, who placed them in my hands for determination, and a list is given below. It is worthy of note that they all, except two—*Chrysanthellum procumbens*, Rich. and *Euphorbia Terracina*, L.—have already been reported as occurring on the ballast-grounds at New York, Camden, and Philadelphia.

Brassica Sinapistrum, Boiss.
Sisymbrium orientale, L.
Erysimum repandum, L.
Saponaria Vaccaria, L.
Polycarpon tetraphyllum, L. f.
Tribulus terrestris, L.
Cytisus scoparius, Link.
Melilotus Indica (L.) All.
Trifolim procumbens, L. var. *minus*, Koch.
Medicago lupulina, L.
Medicago denticulata, Willd.
Vicia sativa, L.
Vicia hirsuta, (L.) Koch.
Scorpiurus subvillosa, L.
Sherardia arvensis, L.
Calycera balsamitæfolia, Rich.

Erigeron acris, L.
Inula viscosa, Desf.
Xanthium spinosum, L.
Chrysanthellum procumbens, Rich.
Heliotropium Europæum, L.
Anchusa officinalis, L.
Convolvulus arvensis, L.
Solanum nigrum, L., var. *villosum*, Mill.
Verbascum sinuatum, L.
Antirrhinum Orontium, L.
Amarantus deflexus, L.
Amarantus Blitum, L.
Chenopodium album, L., var. *viride*, Moq.
Roubieva multifida, (L.) Moq.
Polygonum hernarioides, Del.
Euphorbia Peplis, L.
Euphorbia Peplus, L.
Euphorbia Terracina, L.
Mercurialis annua, L.
Cyperus rotundus, L.
Cynodon Dactylon, (L.) Pers.

THOS. C. PORTER.

Notes on the Development of Conidia-Bearers in Acrostalagmus, Corda, sp. und.

BY CONWAY MACMILLAN.

(Plate CXXIII.)

On decaying stems of *Dahlia* in the plant-house of the University of Minnesota an interesting fungus belonging to the Hyphomycetes has been observed, sometimes in abundance. It forms tenuous coatings of loosely woven filaments on the *Dahlia* stems, and from these coatings arise delicate, erect, jointed filaments bearing whorls of conidial-branches acropetally arranged, becoming less and less mature as one passes nearer to the tip of the erect filament. These upright hyphæ are about one millimeter in length, and, when abundant, form little forests of conidia-bearers (*conidiaträger*) upon the diaphanous mycelial network, which is closely appressed to the epidermis of the dead *Dahlia* stem.

Under the low magnification of an ordinary Leitz dissecting microscope these tree-like condia-bearers are very distinctly differentiated. The central stouter filament may be detected running from the mycelial cushion to the very end of the conidia-bearer. Along the upper two-thirds it is covered with the close whorls of conidial-branches, arranged for the most part in fours, and becoming briefer and less complicated towards the summit, until, near the apex, they become reduced to slight protuberances barely prominent on the sides of the erect, stout, central filament. The very apex of this central filament is prolonged into a cylindro-conical hypha, so that the whole shape of each conidia-bearer may be roughly compared to the contour of a half-grown tree of *Pinus Strobus*, L., or perhaps even better, to some of the slenderer species of *Araucaria* with their distinctly whorled branches. Examination of a considerable number of plants was made, under powers of from four hundred and fifty to nine hundred diameters, and several different stages in the maturation of the conidia-bearers were noted in detail. An effort was made to trace the complete development of these organs.

The first appearance of the conidia-bearer is as an erect, densely protoplasmic protuberance from a thread of the mycelial cushion. This protuberance increases rapidly in length, retaining throughout its growth a strong zenotropic (apogeotropic) irritability, and a horizontal septum is developed, cutting off a distal, from the basal cell. The distal cell, together with the basal cell, undergoes further elongation, and in the considerably denser contents of the distal cell numerous vacuoles make their appearance, but, in so far as seen, do not attain to any very great size, remaining, on the contrary, about one-quarter the diameter of the cell in which they appear. Synchronously there appear protuberances, at first scarcely perceptible, then rapidly elongating into thread-like projections, upon the wall-area of the distal cell. Originally these protuberances are isodiametrical, but before they equal in length the diameter of the cell producing them a swelling in the free end of the projection is seen to take place. The growth of the branch now continues in such a way that the central filament of the conidia-bearer supports four lateral club-shaped branches, each of which is elongated considerably—perhaps one-fortieth mm. from insertion to apex—and stands very nearly at right angles with the central filament and with the two adjacent sister-branches in the same whorl. Before any whorl has arrived at this stage the next whorl above will be seen to be developing as filamentous outgrowths, or as projections, from the central hypha.

After having assumed the club-shaped appearance just described, the branch-hypha elongates further, becomes distinctly vacuolated and swells somewhat along its whole extent in such a manner that the points of greatest constriction are just at the insertion of the hypha, and just below the club-shaped apex. Further development now takes place in the terminal swollen area of each branch-hypha in such a way that the extreme apex is prolonged into a conical point, and four similar conical projections appear equidistant from each other around the equatorial region of the terminal swollen area. Each of these five projections thus formed continues its growth and behaves much as did the parent branch-hypha. Thus five secondary branch-hyphæ are produced, or four, if we choose to consider the terminal projection as a continuation of the primary branch-hypha. Each of the five projections develops a ternary five-lobed projection, and in rare cases each ternary lobe may develop a series of five quaternary lobes. In the formation of secondary, ternary and quaternary lobes or branches the whorled arrangement is not original, but is the result of post-developmental compression, differing from the formation of the primary branch-hyphæ. In this latter case alone did the whorl seem to be a true whorl. The development of ternary lobes is usually not followed by the elongation and differentiation of each lobe into a hypha and quaternary-lobe-series. This was noted in but one conidia-bearer among over two hundred.

The ternary lobes (or quaternary in cases where they occur) are the conidial areas. The process of forming the conidia is as follows:

Each lobe becomes swollen into a more or less spherical shape, and the greater part of the convex surface becomes at first faintly rugose. Later it is seen to be covered with small hemispherical buds. These buds undergo basal constriction and become more or less distinctly obovoid in appearance. The buds, which are destined to become the conidia, do not extend into the concavities of the lobe-system or into the interlobal areas of the secondary branch-hyphæ. They remain thickly aggregated upon the convexities. They develop more rapidly upon the lateral ternary lobes, and more slowly upon the terminal ternary lobes. Likewise the development is, as a whole, more rapid upon the lateral secondary branch-hyphæ than upon the terminal. These facts are strictly in accord with the acropetal development of the whole conidia-bearer.

Each conidial area, at first simply regose from the crowded projections on its surface, gradually becomes clothed with the oborate buds which grow and become abstricted into fusiform or somewhat acutely ovate conidia, 6-7=2½-3½ $\mu\mu$ in diameter. In a single conidia-bearer one may see all the gradations in the branch whorls, from the mere projecting warts towards the apex to the ternary or quaternary lobed branches near the base. In all cases examined the basal third of the central filament does not become clothed with primary branch-hyphæ, but remains unbranched, septate, thick-walled, as a supporting trunk.

Examination of mature conidial-branches shows an increase in the size of the vacuoles until in the branch which has completed the abstriction of its conidia we find only traces of protoplasm in the hyphæ and lobes, the greater portion being occupied by the enlarged coalescent vacuoles.

No septæ have been observed in any part of the conidia-bearer except in the central filament. Here, too, they are principally confined to infraconidial areas, and occur very rarely between successive whorls of primary branch-hyphæ. This fact, taken in connection with the great enlargement of vacuoles in mature conidial-branches, may be considered as a physiological adaptation by which the transfusion of protoplasmic substances into the distally situated conidia is always easily brought about, there being no membranes in the way to compel dialysis.

The whole plant is hyaline or whitish, and would seem to be quite certainly in the genus *Acrostalagmus*, Corda, although the mucilage layer surrounding the conidia—distinguished by Berlese, thus correcting the older view of a capsular wall—was not satisfactorily demonstrated. It certainly is not *Botryosporium*, which is the only genus of Hyphomycetes mentioned by Farlow and Seymour as occurring on North American plants of *Dahlia variabilis*, Desf. The conidia themselves were carefully studied, and a few cultnre experiments were made with negative results.

The conidia are mediumly thick-walled, hyaline. The cells of the central filament, in the infraconidial portion, were, in specimens measured, from 10 to 18 μ in diameter, and from 10 to 40 μ in length. The cell contents in the infraconidial portion were pretty free from granular substances, and were in some cases slightly refringent; but in the conidial portion the cell contents became decidedly granular. This granulousness was most marked in the terminal area of the central filament, where, too, glycogen-tests revealed an abundance of this substance.

Very good diagrammatic representations of *Acrostalagmus* conidia-bearers is given in Fig. 3 on p. 37 of Zopf's Die Pilze, but this considers only a simple case where the branching is not even secondary, to say nothing of ternary or quaternary. Fig. 3, p. 42, of the same work gives a rather better idea of the more complicated forms, such as have been described above.

DESCRIPTION OF PLATE CXXIII.

Figures illustrating the development of conidia-bearers in *Acrostalagmus*, Corda, *sp. und.* All were drawn under Leitz obj. 7, 9 and $\frac{1}{12}$ with the Abbe Camera, from specimens cultivated on stems of *Dahlia variabilis*, Desf, in the plant-house of the University of Minnesota, May, 1891.

Fig. 1.—Tip of central filament, showing mode of origin of primary branch-hyphæ in whorls of fours.

Fig. 2.—Young branch-hypha.

Fig. 3.—Older branch-hypha, showing origin of secondary branch-hyphæ.

Fig. 4.—Still older branch-hypha, showing secondary hyphæ more fully developed and producing the temary lobes.

Fig. 5.—Conidia, abstricted and showing fusiform or sharply ovate shape.

Fig. 6.—Branch-hypha, showing developed secondary hyphæ and ternary lobes, some of which are bearing immature conidia. Illustrates also the acropetal succession of conidia.

Figs. 7, 8, 9.—The first appearance of the conidiophore and the segmentation of the primitive bud.

Fig. 10.—A single conidial lobe showing method of conidial abstriction. (Optical section).

Some Duplicate Binomials.

By Conway MacMillan.

The suggestion in the September TORREY BULLETIN regarding duplicate binomials is so excellent that it will scarcely fail of universal adoption (after a season of recalcitrant objection), even in that peculiarly overshadowed field—the American, spermaphytic, systematic botany.

A few duplicate binomials are here appended. The writer chanced upon them while indexing the Spermaphytes of the Minnesota Valley:

APIOS APIOS (Linn.).

Apios tuberosa, Mœnch. Meth. 165 = *Glycine Apios*, Linn. Spec. ed 1. 753.

SYMPHORICARPOS SYMPHORICARPOS (Linn.)

Symphoricarpos vulgaris, Michx. Fl. 1, 106 = *Lonicera Symphoricarpos*, Linn. Spec. ed. 1. 175.

DIERVILLA DIERVILLA (Linn.).

Diervilla trifida, Mœnch. Meth. 492 = *Lonicera Diervilla*, Linn. Mat. Med. 62; Spec. ed. 1. 175.

TARAXACUM TARAXACUM (Linn.).

Taraxacum officinale, Weber Prim. Pl. Holst. 56 = *Leontodon taraxacum*, Linn. Spec.

OXYCOCCUS OXYCOCCUS (Linn.).

Oxycoccus palustris, Pers. Syst. = *Vaccinium Oxycoccus*, Linn. Fl. Dan. 1. 80.

PENTSTEMON PENTSTEMON (Linn.).

Pentstemon pubescens, Solander Ait. Kew. II, 360 = *Chelone Pentstemon*, Linn. Mant. 415.

CORALLORHIZA CORALLORHIZA (Linn.).

Corallorhiza innata, R. Br. Ait. Kew. 5, 208 = *Ophrys Corallorhiza*, Linn. Spec. 1. ed. 945.

The writer fails to see wherein the strictures upon this method of naming, found in *Pittonia*, 1891, pp. 213-215, are applicable. It is not so important that the names of plants should meet with the approval of someone's more or less highly cultivated and certainly individualized æsthetic sense, as it is that they should be made to conform to some simple and iron-clad law. The law of priority should be one without exceptions.

Comparison of the Suillivant Catalogue of the Plants of Franklin County, Ohio, with the List of 1891 by Selby and Craig.

A little more than fifty years ago Mr. Wm. S. Sullivant published a catalogue of the phænogams and vascular cryptogams of Franklin County, Ohio.

A revision of this catalogue, with such additions as have been observed, has been published, and the object of this note is to point out the number of new plants introduced into a central county of Ohio during the last half century. The interest in a comparison of these two plant lists is increased by the fact that the surveys and explorations of the county by Prof. Sullivant and his co-laborers of fifty years ago were for that time industrious and painstaking.

Franklin County is a fair type of the counties occupying the drift-covered region of central Ohio, and shows the intimate relation of a flora to the geological formation, climatic condition and topographical features of the district included within its limits.

I have tabulated in order of their sequence the natural orders which are now represented by ten or more species.

	Additions.		Total in County.
	Introduced.	Total.	
Ranunculaceæ	3	7	30
Cruciferæ	9	13	31
Violaceæ	1	4	11
Caryophyllaceæ	1	1	13
Leguminosæ	7	9	40
Rosaceæ	2	8	36
Umbelliferæ	3	5	24
Rubiaceæ		5	13
Compositæ	20	53	140
Primulaceæ	1	3	11
Solanaceæ	5	6	10
Scrophulariaceæ	2	2	29
Labiatæ	5	10	42
Polygonaceæ		4	22
Euphorbiaceæ	13	4	10
Urticaceæ		2	13
Cupuliferæ		3	14
Orchidaceæ		3	19
Liliaceæ	1	2	25
Cyperaceæ		5	75
Gramineæ	5	14	79
Filices		2	25
Ophioglossaceæ		2	5

Total in County	1002
In Old Catalogue	779
Introduced Plants	15%
Additions	223
Introduced, nearly	40%

W. R. Lazenby.

The Host-Plants of Aphyllon fasciculatum.

By E. J. Hill.

The parasitism of this plant has mainly, but not exclusively, been fixed upon species of *Artemisia*. It has been known to grow on the roots and buried cuttings of *Pelargonium zonale* cultivated in pots in greenhouses.* In the "Synoptical Flora of North America," Gray's "Manual of Botany," and Coulter's "Rocky Mountain Botany," the host-plants are said to be *Artemisia*, *Eriogonum*, etc. What the convenient but tantalizing *et ceteræ* may cover is hard to tell. It may be facts or guesses to gloss over inadequate observations, or some difficulties in tracing the connection between the host-plant and parasite. The variety *luteum*, found by Dr. Parry in Wyoming, is, on the above authorities, said to grow on the roots of grasses. In the Botany of the Wheeler Survey, Dr. Rothrock mentions only *Artemisia frigida*, Willd. "To this we frequently find *Aphyllon fasciculatum*, T. and G., attached, parasitic attachments uniting the roots of the two." † "*Aphyllon fasciculatum*, Gr., Colorado. Attached by its rootlets to those of *Artemisia frigida*." ‡ Here the connection was evidently traced, though the language is hardly accurate, since there are no roots or rootlets belonging to *Aphyllon*, these all pertaining to the other member of the couple. Macoun says of it, "Parasitic on the roots of *Artemisia* on sand hills and prairies." § Parry ‖ mentions it growing on "bare granite rocks along the upper Minnesota River," but does not specify the attachments to other plants. It would be very interesting to study the connection in a locality like this.

Doubts have been expressed whether the limitations of the parasitism to *Artemsia* is not too restricted. Among these doubts some refer to plants growing in Northern Indiana, a few miles east of Chicago.¶ This is the only locality where I have found this *Aphyllon*, and under conditions very favorable for observing its habits. It was first detected in 1884, and has been frequently noticed since. Probably a hundred plants have been examined, most of which have been dug up, and the connection with the sustaining plant in many cases traced and verified. But in order to remove all doubts which may have arisen or been left in my own mind, the most extended and careful observations were made the past summer, since the locality was convenient and the material abundant. As far as these investigations have extended, they indicate that *Aphyllon* in this place grows on *Artemisia* alone, and the experience obtained by searching for connections with other plants goes to show that such relations are extremely problematical. And while it would not be safe to say that it may not also be found attached to other plants here, since there is evidence that it can grow on *Pelargonium*, *Eriogonum* and grasses, I have failed to find it on *Arctostaphylos Uva-ursi*, or any grass-plants on which it was inferred to be parasitic. Nor would any proof be deemed valid which did not show the union of the two plants.

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* Bull. Torr. Bot. Club, xiv. 220. Bot. Gaz. xii. 235.

† U. S. Geol. Sur. W. of 100th Merid. vi. 176. ‡ l. c., p. 217.

§ Cat. of Can. Pl., Parts I-III, 373.

‖ Geol. Sur. of Wis., Iowa and Minn. (Owen), p. 616.

¶ Bull. Torr. Bot. Club, xvi. 216, 330.

Aphyllon fasciculatum, Gray, is a common plant by the shore of Lake Michigan, between Edgemoor and Pine, railway stations in Lake Co., Ind. It is especially abundant near the latter place. In their season hundreds of plants can here be found growing in the loose sand, partially shaded by scattered trees or clumps of *Pinus Banksiana.* This sand affords unusual facilities for tracing the connection between the host-plant and parasite, since it is easily dug up, though the root fibrils on which the haustorium is often formed are so delicate as to sever the connection by very slight disturbance, and require most careful handling. In some cases the inference might be drawn that there was no host whatever, if judged by superficial appearances. A little experience showed that surface indications were a deceptive clue to the subterranean connections. An *Aphyllon* might stand very near a bunch of grass, or shoot up even among the trailing stems of *Arctostaphylos*, but the thread-like root joining the plants led invariably to an *Artemisia.* Some were found within an inch or two of an *Artemisia* plant, and the inference was natural that they were joined, but the real host would be a foot or two away.

This led to a careful study of the root-system of *Artemisia*—n the present case *A. Canadensis*—and its comparison with those of other plants growing in the sand. It has a vertical tap-root six or eight inches long, from which long, slender branches are sent off horizontally, so that the sand is quite well pervaded by those coming from various plants. They run along beneath the surface at a depth of two to six inches—most commonly at two to three inches—and hence are easily reached by the stem of the *Aphyllon.* They are very slender, barely more than an eighth of an inch in diameter when they leave the main root, so that they are thread-like in appearance, changing their dimensions quite imperceptibly. In all cases of interest they were accurately measured when freshly taken from the ground, and the distance of the *Aphyllon* from the main root ascertained. The longest distance was forty-three inches, the root in this case running quite direct. Others stood at the distance of thirty-seven and thirty-three inches respectively, and so on down to half an inch, or a close connection. Sometimes two or three are supported by the same root, or by different roots of the same plant.

These roots are somewhat sparsely furnished with hair-like fibrils, to which the parasite may be grown. It is in such cases that the connection is difficult to maintain, the fibrils being so easily broken off while digging the sand away. Hand-digging was the most successful in following the slender roots, which fortunately were found to be elastic and stronger than their size would indicate. After a few trials and comparisons they were readily distinguished from other roots pervading the sand, and followed among those of grasses and *Arctostaphylos*, the most common of the accompanying plants. They differed in color, structure and taste. Those of *Arctostaphylos* are dark red or brown, the outer bark loose and dark colored, the inner lighter. They are also woody and branch considerably. The roots of *A. Canadensis* are pale brown, the bark closely adherent and finely creased longitudinally, under the lens resembling the furrowed bark of a tree. They are also very finely crooked, and present a crinkled or a slightly spiral look when held before the eye, like that of a fibre untwisted from a thread. This gives them elasticity, for by taking a piece a foot or two long and stretching it, the kinks are straightened out but immediately reappear when the force is relaxed. And though species of *Artemisia* are commonly bitter, the roots of *A. Canadensis* are pungent, so much so that on tasting them quite frequently the pungency remained upon the tongue for a couple of hours after the work had ceased, leaving still longer a feeling of rawness. This test was very useful in cases where the *Aphyllon* became detached, for even the fibrils are sufficiently characterized by this taste to be distinguished. It is rare for the parasite to be without an attached fibril, unless it grows on some larger part of the root. The *Aphyllon* has a very bitter taste. Its haustorium is formed by an enlargement of the base of the stem, turned a little to one side. Through it the root of the *Artemisia* passes, and when the parasite is near the end of the root this soon terminates in a fibril an inch or two beyond the haustorium. Usually it does not branch except near the main root, but runs on singly, possessing the small rootlets only. The roots of the grasses, mostly those of *Calamagrostis*, *Panicum* and *Andropogon*, are tough and wiry, the bark loose and easily slipped off. They are commonly fuzzy with hairs to which particles of sand cling in abundance. To the taste they are insipid.

By applying tests like these no roots were found with an *Aphyllon* attached that did not accord with those of *Artemisia*.* It would be easy at times to draw a different conclusion from appearances on the surface, as when an *Artemisia* did not seem to be near enough to furnish the required support, but if one were within four or five feet it doubtless would serve. I do not know how far the roots of *Artemisia* may extend in the sand, but as they taper so imperceptibly the length may go considerably beyond the forty-three inches mentioned above, since the fibril in which they are apt to end is a sudden tapering relative to the part between the parasite and the tap-root. The roots of most plants in the sand are unusually long. I have traced those of *Cnicus Pitcheri*, a stout, branching plant a foot or two high growing in the same loose sand, to a distance of eight feet, and then lost them. Sometimes an *Artemisia* is invisible or easily overlooked, but on following the root from the *Aphyllon* a dead plant would be found, generally small and nearly or quite buried in the sand. Some withered and blackened leaves showed that it had started in the spring and grown for a while, but had evidently died of exhaustion, giving its life to sustain the parasite. This also would be dead under such conditions, having perhaps perfected its seed, though those on stronger hosts are perennial, the stems only dying after fruiting, the haustorium and parts adjacent being provided with buds for a new growth.

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* In the recently published "Flora of Cook County, Illinois, and a part of Lake County, Indiana," it is said on my authority to be "a parasite on *Antennaria*." This is a mistake or faulty reading, for my note book, which the authors had for consultation, reads "parasitic on *Artemisia*."

An Economic Mulberry.

The August issue of the BULLETIN contains an interesting note and figure of a Linden which had taken root in the decomposed wood of its own trunk, an occurrence by no means commonly observed and, as it seems, but rarely recorded. Not long ago, however, there appeared in one of our papers, as copied from an English paper, an account of an English Oak which had "sustained itself for years by a mass of roots grown into its own trunk!"

To the phenomenon described in the BULLETIN by Mr. Sargent for the Linden may be added a similar one lately observed in the trunk of a small White Mulberry, standing in the grounds of the Department of Agriculture. The conditions are essentially the same as those noted in the case of the Linden, except that the Mulberry is perhaps more seriously injured, a considerable portion of its trunk being destroyed by decay. The adventitious roots observed spring from the free border of a longitudinal crack where the trunk forks, the edges of the wound having been "healed" for some time, while the subsequent decomposition of the exposed inner layers of wood formed a quantity of mould, which, lying in contact with the healed borders, seems to have induced the growth of adventitious roots from one side into the decayed mass.

In considering the precise conditions under which this apparently peculiar growth is produced, as well as the fact that, as far as observed, the adventitious roots proceed only from vigorous, newly-formed wood, perhaps these cases may not be more phenomenal than the production of roots from a cutting, or from a layered branch, where new wood is subjected to the same conditions, and therefore seem to be quite analogous to the case in which the Linden and Mulberry produced roots, if not an expression of the same law. The apparent incongruity exhibited by a plant deriving, as it seems, nourishment from its own body appears more striking at first thought than if we consider that the lignified part of any living trunk, if reduced by decay, is as fittingly a plant food as that which may be appropriated by the same individual from its own accumulation of decayed leaves, provided, of course, the necessary moisture is present in the humus. GEORGE B. SUDWORTH.

Forestry Division, Department of Agriculture.

Botanical Notes.

Sweet Potato Blossoms. While in South Jersey last fall I was much surprised to find one field of sweet potatoes in full bloom! Literally this was true, for upon any single square rod of the field there were hundreds of the large, handsome, pale pink, tubular blossoms, and many more buds preparing for anthesis. In conversation with a local botanist, and one who has always lived in the sweet potato region and among the plants for many years as a grower of "sweets," I learned that he had never seen a single bloom, and his face lighted up to such an extent when he obtained an herbarium specimen that it was an inspiration to me to send this note to the BULLETIN. If the blossom is such a rarity in New Jersey, the wonder is if the same is true in the Carolinas and further south, where its native haunts may possibly be, although to this generation they are unknown. It is possible that this particular field was set with plants of a strain foreign to the Jersey soil. BYRON D. HALSTED.

Mimulus moschatus, Dougl. in N. Y. State.—Some years ago I was told by a friend from here of finding the musk-plant in Saratoga County wild, which I would not believe. Later he tried to convince me by showing me living specimens, but I remained sceptical, as I always heard the plant was not hardy in our climate, and probably only an escape from cultivation. The 3d of July last, however, I drove out with the sportsman the twenty-five or more miles from here through West Milton to Middle

Grove, town of Greenfield, Saratoga County, following the course of the boisterous Kayderoserus to the mouth of the famous trout brook, Morehouse Brook, No. 1, about one mile northwest of Middle Grove village. The very first thing I met here after crossing the bridge were whole patches of the *Mimulus*, hanging over the banks of the brooklet, with their frosty foliage perfuming the whole atmosphere. Following the course of the water the plant was found wherever a clear space was left for the sun to shine upon the loamy soil. About one mile up the creek—in full view of the foot-hills of the well-known Adirondacks, the plant has its headquarters in a springy swamp, growing in all directions in the midst of the water, often two feet high. A trapper informed me of having known the plant here always and nowhere else in the neighborhood. How this far western plant came there I am not able to tell, but it is there and in great abundance. J. H. WIBBE.

[This species was found by the late Mr. Julius A. Bisky in 1886, growing in a boggy swamp, about two miles east of Locust Valley, Queens Co., Long Island, N. Y., on the right hand side of the Oyster Bay road. He reported it as perfectly at home, and scattered over a considerable area (BULLETIN, xiv. 13). A specimen from this locality is preserved in the Columbia College Herbarium.—N. L. B.]

Reviews of Foreign Literature.

Monographiæ Phanerogamarum. Vol. vii. Melastomaceæ. Alfred Cogniaux. (8vo. pp. 1256, Paris, July, 1891.)

M. Cogniaux's long-continued studies of the Melastomaceæ have culminated in the production of this fine volume. It contains descriptions of 2,702 species and 534 varieties. *Miconia* is the largest genus, containing 518 species. Seven genera accepted by Bentham and Hooker are rejected, and the following new ones proposed: *Schwackæa*, *Benevidesia*, *Bisglaziovia*, *Barbeyastrum*, *Beccarianthus*, *Boerlagea*, *Brittenia* and *Medinillopsis*. As in M. Cogniaux's previous monographs, the oldest unpreoccupied specific names satisfactorily ascertained are adopted. An appendix of twenty-two pages contains additional species, which have come to notice during the printing of the book, the main portion having been completed in September, 1889. N. L. B.

An Enumeration of all the Species of Musci and Hepaticæ recorded from Japan. Wm. Mitten. (Trans. Linn. Soc. iii. 2d. Ser. 153-206, t. 58.)

This is a most interesting contribution, as it enumerates forty-nine species which occur within our limits besides two previously known only from America, *Drummondia clavellata* and *Climacium Ruthenicum.* Of new species fifty-six are described and four figured. A few changes and remarks are worthy of notice. *Eustichium Savatieri*, Husnot, is changed to *Bryoziphium Savatieri*, Mitten overlooking the fact pointed out by Geheeb that *E. Japonica*, Berggren, antedates it by two years and therefore it should be *Bryoziphium Japonicum* (Berggren). *Campylopus Leanus* is reported sterile as with us, though said to fruit in India. On page 182 is noted the fact already well known that *Hypnum Flemmingii*, Austin, is identical with *H. robustum*, Hook. *H. paludosum*, Sull., is listed as *Amblystegium paludosum*, Mitten. E. G. B.

Faut-il dire Oscillatoria ou Oscillaria? Maurice Gomont. (Journ. de Bot. v. 273.)

The very complicated nomenclature of *Oscillatoria* is traced to the earliest known mention of that genus of fresh water algæ and the following synomyns established: *Oscillatoria*, Vaucher, Histoire des Conferves d'Eau douce, p. 165 (1803). *Oscillaria*, Pollini, Viaggio al Monte Baldo e al lago di Garda p. 36 et seq. (1816). Bosc. Nouveau dictionnaire d'histoire naturelle appliqué aux arts et à l'agriculture, xxiv. 196 (1818). Bory. Dictionnaire classique d'histoire naturelle i. 594 (1822).

In the Nouveau dictionnaire Bosc refers to "Oscillaires," wrongly termed "Oscillatoires" by Vaucher in his excellent memoir on fresh water algæ, but does not give any authority for the name he (Bosc) adopts, and which name, had he established it himself previous to the publication of Vaucher's work in 1803, he would doubtless have referred to. M. Gomont remarks that as Bosc wrote a number of memoirs in various publications in Europe, and also possibly in the United States, where he resided previous to 1803, there may still be something in existence on the subject unknown to him, and if so, anyone having any knowledge of any facts in relation thereto would confer a favor by communicating the same. A. M. V.

Index to Recent Literature Relating to American Botany.

A New Herbarium Pest. C. V. Riley. (Gard. and For. iv. 543, 544, fig. 84, 85).

An illustrated description of a new pest found in the herbarium of the Department of Agriculture, chiefly infesting plants from the southwestern part of the United States. It has been determined to be a new species of geometrid moth, under the name *Carphoxera ptelearia.*

Abies magnifica, var. *Shastensis.* (Gard. Chron. x. 430; f. 55)

Adiantum cuneatum. (Gard. xl. 360; illustrated).

Agave albicans. J. G. Baker. (Bot. Mag. t. 7207).

American Beech—The. (Am. Gard. xii. 742, 743; illustrated).

An account and full page plate of *Fagus ferruginea.*

American Buckeyes—The. (Gard. and For. iv. 517, 518, fig. 81).

Contains a representation of *Æsculus Californica.*

Annual Report of the State Botanist. Chas. H. Peck. (From 44th Ann. Rept. N. Y. State Museum Nat. Hist., Albany, Jan. 31st, 1891; pl. i-iv).

In the list of additions to the State Herbarium here noted are thirty-six species of fungi described as new, of which the following are figured: *Armillaria viscidipes, Crepidotus distans. Omphalia corticola, Pleurotus campanulatus, Saccharomyces Betulæ, Cortinarius albidus, Tricholoma grande, Ramularia graminicola, R. destruens, Cercosporella Veratri, Aspergillus aviarius, Septomyxa Carpini, Bispora effusa, Caryospora minor* and *Phyllosticta Ludwigiæ.*

Polypodium vulgare, L., var. *cristatum*, Lowe, is described and figured from specimens collected in Dutchess County.

The genus *Tricholoma* is made the subject of a monograph, and forty-eight species from New York are collected.

A list of the fleshy-fungi of Maryland, by Miss Mary E. Banning, is included. It numbers one hundred and seventy-nine species, of which fourteen are described as new. The manuscript, accompanied by one hundred and seventy-five colored plates, has been donated to the New York State Museum, where they have been bound in one large volume for safe keeping and preservation. The botanists of New York should certainly feel proud of this mark of appreciation from one outside the State, and it ought to stimulate them to at least show equal zeal and interest in adding to the value and scope of the State Herbarium.

A. H.

Aster cordifolius. C. W. Dod. (Gard. xl. 337; illustrated).

Berberis aquifolium. (Gard. xl. 383, 384; illustrated).

California Wild-Flower Notes. K. P. S. Boyd. (Am. Gard. xii. 737, 738; illustrated).

Contains cuts representing *Abromia umbellata, Mimulus cardinalis, M. luteus,* and *M. glutinosus.*

Callirhoë Papaver. (Gard. xl. 541, with colored plate).

Calandrinia oppositifolia. (Gard. xl. 485; illustrated).

Catalogue of Flowering Plants and Ferns of Santa Cruz County, California. F. L. Clarke. (Pamph. pp. 13, Santa Cruz, Calif).

This list was compiled from specimens collected by the pupils in the public schools of Santa Cruz County, as a result of the "Wild Flower Contest," inaugurated by the *Santa Cruz Surf.* Additions to the list were made by Dr. C. L. Anderson, and the modest wish is expressed that the work may serve as a nucleus to which many additions may be made in the future.

Cereus procumbens. (Bot. Mag. t. 7205).

Colors of Flowers.—I. II. E. W. Hervey. (Gard. and For. iv. 568-570; 578-580).

The author seeks to show that nature begins in all colored flowers by a change from green to white, and thence to the brighter colors,—that this the line of the evolution of colors. In other words, that chlorophyl is first eliminated from the specialized leaves and a white subject prepared on which the more diverse colors can be painted. The other colors, the author concludes, do not follow each other in any sequence, but may spring directly from the white and are of equal rank. The examples given and the course of reasoning employed are interesting, to say the least.

Colors of Leaves. E. W. Hervey. (Gard. and For. iv. 591, 592).

This is a sequel to the author's previous article on the colors of flowers. The course of reasoning is similar, and the question asked is whether the green color of leaves is the original color, or is it secondary. The conclusion is reached that our green vegetation has been derived from white. The well-known fact is quoted that the cotyledons or embryo leaves of all plants are almost uniformly white, and this is considered significant. Both articles are suggestive, and offer unlimited field for the imagination.

Cucurbitacearum Novum Genus et Species. A. Cogniaux. (Proc. Calif. Acad. Sci. iii. 58-60).

Brandegea with two species, *Bigelovii* and *monosperma*, is described as new. Also *Echinocystis Brandegei.*

Couroupita Guianensis. W. E. Broadway. (Gard. Chron. x. 649, 650, f. 94).

Diatoms: Their Life-History and their Classification. Frederick B. Carter. (Am. Month. Mic. Journ. xi. 276-280; xii, 1-6; 81-85; 97-101; 121-123, pl. I, II).

That portion of this series of papers which relates to the structure and life-history of the diatomaceæ is very interesting, and may be read with profit by those who are making a study of these minute organisms. The discussion of the structure of the diatom frustule is particularly readable, considerable space being devoted to showing the confusion which has arisen from the use of the word *hoop* to designate what William Smith calls the *connecting zone,* i. e., that portion of the frustule which is seen in front view. By the by, Count Castracane aptly speaks of this view as the *zonal view,* a term which is more expressive than *front view*, and which, for that reason, should come into general use.

In treating this part of the subject, the writer surely nods a little, however. On page 84, in his remarks in reference to *Fragilaria*, he appears to have fallen into the error of supposing that all diatoms have the "pill-box" structure. But Prof. H. L. Smith, whom the writer quotes, distinctly mentions *Fragilaria* as one of the genera in which the edges of the hoops are simply opposed instead of sliding one over the other. (Lens, vol. 1, p. 72). In such a case, one would certainly not expect to find a diminution in the breath of the filaments.

A valuable part of the paper is that which discusses the range which must be allowed in the size of the frustules. It is undoubtedly the case that too frequently difference in size has been almost the only reason for constituting a new species.

In a paper of this character, intended to guide observers in the determination of genera, it is sincerely to be regretted that the author did not follow the classification of Prof. H. L. Smith, now so generally accepted. A number of the generic names mentioned are so ancient that their use is likely to create confusion.

The division into fresh water and marine genera is not at all a happy one. Of the thirty-four genera enumerated on page 98 as fresh water, eleven are also marine, while two others,—*Terpsinoë* and *Schizonema*—are exclusively marine. Nearly all the species of *Pleurosigma*, also, are either m arine or brackish. As *Navicula*, *Surirella*, *Campylodiscus*, *Synedra*, *Melosira*, *Nitzschia*, *Cocconeis* and *Achnanthes* are given among the fresh water and omitted from the marine genera, it is evident that the author ranks these as exclusively fresh-water forms. This is quite incorrect, as the number of marine species belonging to the genera named is, in most of them, even more numerous than the fresh-water species. Some of the most interesting forms commonly found in marine collections, are conspicuously absent from the list of marine genera, as, for instance, *Coscinodiscus*, *Amphiprora*, *Actinoptychus* and *Actinocyclus*. It is true that three of these are mentioned in the list of fossil forms, but then it is not made clear that the list of fossil forms given represents a marine deposit. Surely the writer must be aware of the fact that there are fresh water as well as marine deposits.

While the descriptions of genera were not intended to be minutely accurate, yet some of them are so loose as to be misleading. For instance, in telling how to distinguish *Campylodiscus*, *Surirella* and *Cymatopleura*, the statement is made that if the frustule is twisted the specimen is a *Campylodiscus*. This would sadly puzzle a beginner, for *Surirella* and *Cymatopleura* are also frequently twisted. The word "twisted" has been used to describe the shape of a *Campylodiscus*, but, to most minds, the old term "saddle-shaped" would be more expressive.

Perhaps it may not be amiss to add in conclusion that there is certainly no better guide to the determination of genera than is given in the "Conspectus of the Diatomaceæ," by Prof. H. L. Smith, first published in "The Lens," in 1872, but lately reprinted by Dr. Wolle in his work on *The Diatomaceæ of North America*.

C. H. K.

Directions for Collecting Recent and Fossil Plants. F. H. Knowlton. (Part B. Bull. 39, U. S. Nat. Mus. Pamph. pp. 46, illustrated, Wash. D. C., 1891).

Erythrina crista-galli. (Gard. xl. 516, with colored plate).

Flora of the Cape Region of Baja California. T. S. Brandegee. (Proc. Calif. Acad. Sci. iii. 108-182 ; also reprinted).

This work is the result of two trips made by the author during the autumn of 1890. The list includes six hundred and seventy-nine species and varieties, of which about thirty are fully described as new and some twenty-five more listed as such, but not described.

Filices Mexicanæ.—III, IV. (Gard. and For. iv. 519, 520, fig. 80., 555, 556, f. 88.)

Contains description and figure of *Notholæna rigida* n. sp. and *Pellæa Pringlei* n. sp.

Forest Vegetation of the Upper Mississippi.—III. (Gard. and For. iv. 531, 532).

Helenium autumnale. (Gard. Chron. x. f. 56).

Helenium autumnale. (Am. Gard. xii. 683, illustrated).

Hypericum Buckleyi. (Gard. and For. iv. 581, fig. 91).

Index to Economic Products of the Vegetable Kingdom in Jamaica.

This is a list of the plants most deserving attention for their medicinal properties or economic products. One hundred and thirty-eight are native to Jamaica and ninety-four naturalized or cultivated. The habitat of each plant, as well as its properties and uses, are given, but nothing is said of its value or importance, present or prospective on the island. Twenty-three of the species are also indigenous to the United States, from common plants like *Erigeron Canadense* and *Lycopodium clavatum* to subtropical trees like *Prosopis juliflora*, *Rhizophora Mangle* and *Carica Papaya.* The presence here of *Prosopis juliflora* (Mezquite) brings to the mind its wide dissemination in the new world, from California to the mouth of the Rio Grande, and from Colorado, through Mexico, to Panama, Nicaragua, Chili, Buenos Ayres and the West Indies. In Jamaica this tree is common and the wood largely used.

Besides the ordinary garden vegetables, which are not included, at least sixty more of the plants enumerated are cultivated or susceptible of cultivation in our Southern States, such as *Arachis hypogœa*, *Camellia theifera*, *Chrysobalanus Icaco*, *Ananas sativa*, and species of *Citrus*, *Anona*, *Musa*, *Eucalyptus*, *Opuntia*, *Agave*, &c.

Jamaica, the largest and most important of the British Islands in the West Indies, has been especially favored by nature; high mountains, rising in several places to an altitude of nearly 8,000 feet, diversify its surface and materially affect the temperature and rain-fall of its different parts; many rivers spring from the foot-hills and water fertile lowlands. The climate and soil vary so much as to permit the culture of most plants from the northern temperate regions as well as those from the topics; thus, while the cinchona tree and coca are cultivated in the mountains, the coffee in the foot-hills and the cocoa on the coast lands, special attention is also being turned to the raising of garden vegetables with a view to supply the markets of the United States during the winter and spring.

The great staple of the island is still sugar-cane; coffee perhaps ranks next in importance. Cotton and maize are also generally cultivated. The most conspicuous and useful native trees are: *Swietenia Mahagoni* (mahogany), *Brosimum alicastrum* (bread-nut), *Eriodendron anfractuosum* (silk-cotton tree), *Dipholis montana* (mountain bully tree), *D. nigra* (black bully tree), *Sapota Sideroxylon* (naseberry bullet tree), *Sloanea Jamaicensis* (green-heart), *Amyris balsamifera* (rosewood), *Vitex umbrosa* (fiddle wood), *Laplacea Hœmatoxylon* (iron wood). Of the species of cinchona under cultivation, *C. Ledgeriana*, Mœns. is the most promising from the vigor of its growth and the large percentage of quinine in its bark. The Liberian coffee (*Coffea Liberica*) is also looked upon with growing favor. V. HAVARD.

Late Persisting Leaves on Trees. J. G. Jack. (Gard and For. iv. 567, 578).

Notes in regard to this subject are given for *Magnolia glauca*, *Quercus alba*, *Q. coccinea*, *Q. tinctoria*, *Q. rubra*, *Ulmus campestris*, *Juglans* sp., *Hicoria* sp., *Fagus* sp.

Lepachys columnaris. (Meehan's Month, i. 65, 66, Pl. 5).

Les Plantes Européennes introduites dans la Vallée du Minnesota. Conway MacMillan. (Rev. Gen. de Bot. iii. 289).

The phanerogamous plants of Minnesota number some thirteen hundred, nearly a third of which are of European origin. Prof. MacMillan gives a list of these according to their geographical distribution in the State, and indicates their course in penetrating into the interior.

Manzanita—The. (Gard. and For. iv. 565, 566, fig. 90).

Illustrated description of *Arctostaphylos Manzanita.*

Moonworts—The Exiled. G. A. Woolson. (Am. Gard. xii. 722-724).

A popular account of our common species of *Botrychium* and the legends and superstitions connected with them.

New California Carices. L. H. Bailey. (Proc. Calif. Acad. Sci. iii. 104-106).

Carex obnupta, *C. quadrifida*, *C. quadrifida*, var. *lenis*, *C. monile*, Tuckm. var. *Pacifica*, are described as new.

Notes on the Distribution of some Kansas Trees, III.—The Oaks. S. C. Mason. (Gard. and For. iv. 508-510)

Notes on *Quercus macrocarpa*, *Q. prinoides*, *Q. Muhlenbergii*, *Q. nigra*, *Q. tinctoria*, *Q. rubra and Ostrya Virginica.*

Notes on the Flora of Nova Scotia—Part I. Geo. Lawson. (Reprint, Trans. Nova Scotian Inst. Sci. Session of 1890-91, pp. 84-110).

This part includes from Ranunculaceæ to Anacardiaceæ. The author lays particular stress upon the fact that the work is to be considered as only preliminary, and that corrections and additions will be thankfully received. The notes are full, and the list when completed will be one of great value.

Our Native Nelumbo. (Gard. and For. iv. 556, fig. 87).

Illustrated description of *Nelumbo luteum* as it appears in a pond in Southern Illinois.

Pines, Hemlocks and Spruces. L. H. Bailey. (Am. Gard. xii. 646-648; illustrated).

Pinus resinosa, *P. Strobus* and *Abies Canadensis* are figured.

Pinguicula lutea. (Bot. Mag. t. 7,203).

Possibilities of Our Native Grapes (*concluded*). T. V. Munson. (Am. Gard. xii. 659-661).

The author concludes his account of what has been done in cultivating and hybridizing the native species of *Vitis.* It is a contribution of great interest, and one which we venture to say will cause surprise to almost every one who has not made a special study of the subject.

Polygala in North America—The Genus. Wm. E. Wheelock. (Mem. Torr. Bot. Club, ii. No. 4, pp. 109-152).

This paper completes Vol. II of our "Memoirs." There has been no monograph of the North American *Polygalas* since their treatment in Torrey and Gray's Flora of North America in 1838-1840. Dr. Wheelock has studied the specimens contained in the larger American herbaria, and Dr. Britton has examined most of the types contained in European collections and has supplied notes thereon. Thirty-eight species are recognized. *P. Reynoldsiæ*, Chapm., is not regarded as distinct from *P. Rugelii*, Shutt.; *P. ambigua*, Nutt., is maintained as a species rather than a variety of *P. verticillata; P. viridescens*, L. is the name accepted for *P. sanguinea*, L., having priority of place on the page of the Species Plantarum, these two Linnæan species being identical; *P. Mariana*, Mill (1768) replaces *P. fastigiata*, Nutt. (1818); *P. Lindheimeri*, A. Gray, var. *parvifolia*, is a new variety from Arizona; *P. Tweedyi*, Britton, is a new species from Texas.

In spite of the most careful proof correction, two vexatious errors have occurred in the paper. On page 146, under *P. cucullata*, *P. Californica*, Nutt. is the name meant to be used as the date of it (1840) as against that of *P. cucullata*, Benth (1849), indicates, and on page 149 *P. ovatifolia*, DC., is uniformly spelled *P. ovalifolia*, DC.

Rose Acacia—The Large-Flowered. (Am. Gard. xii. 739, 740, illustrated).

Contains a figure of *Robinia hispida.*

Rosa Carolina. (Meehan's Month. i. 84, illustrated).

Sarracenia purpurea. (Meehan's Month. i. 81, 82, Pl. 6).

Sisal Hemp in the Bahamas and Florida. (Bull. No. 24, Bot. Dept. Jamaica, 10-15).

Some Strange Names among Indigenous and Other Drugs. (Pharm. Rec. xii. 377).

The following popular names are noted: "Coquetta" or "Bogota Bark" for *Cinchona condaminea;* "Cammock" for *Ono-*

nis spinosa; "Ginger Grass" for *Andropogon schoenanthus;* "Vermont" or "Canada Snakeroot" for *Asarum Canadense,* "Beerlap" for *Lycopodium* sp.

Struggle for Life in the Guianian Forest—The. Jas. Rodway. (Gard. Chron. x. 578, 579; 612, 613).

Mostly concerned with the orchid flora of the region.

The Action of Bacteria on the Rapid Souring of Milk during Thunder Storms. A. L. Treadwell. (Am. Nat. xxv. 1010-1012).

From experiments with milk and electrical discharges the author finds a slight hastening in the time of souring. If the milk is first sterilized, however, no souring is obtained. The conclusion is reached that the souring is not due to oxidation but to the more rapid growth of bacteria under the influence of the free oxygen or ozone generated by the electrical discharges. The small amount of ozone generated during a thunder storm is not considered sufficient to have any appreciable oxidizing effect either, and if rapid souring is produced it is to be attributed to the more rapid growth of bacteria in the sultry atmosphere.

The Specific Name of the Texan Cercis. E. L. Greene. (Gard. and For. iv. 562, 563).

Tillandsia argentea. (Gard. xl. 524, illustrated).

Water Garden—A Typical. (Gard. xl. 533, 534, illustrated).

Gontains a picture of a nook in the garden of Mr. John Gerard at Elizabeth, N. J.

Proceedings of the Club.

MEETING OF DECEMBER 8TH, 1891.

The President in the chair and forty-two persons present.

The subject of the evening, "The Flora of the Higher Catskills," was illustrated by lantern slides, made and shown by Mr. Van Brunt, further supplemented by herbarium specimens.

Miss Anna Murray Vail followed with a paper on the plants collected by her in the region of Onteora during the summer jus passed, and Miss Steele gave a short account of the flora in the neighborhood of Slide Mountain, illustrated by specimens of the rarer ferns and mosses.

Dr. Rusby announced that the prize of fifteen dollars offered last spring for the best set of plants collected within one hundred miles of New York during the summer, had been awarded to Miss Vail.

Dr. Britton remarked upon the *Polemonium* which Mr. Van Brunt and Dr. Rusby had found in the Catskills, and hitherto supposed to be the *Polemonium cœruleum* of Europe. After comparison of complete plants from both countries, he has decided that the North American one must rank as a new species, and gives it the name of *Polemonium Van Bruntiæ*, in honor of Mrs. Van Brunt. The East American plant differs from the European one, especially in having horizontal root stocks and exserted stamens.

The species has been reported from Herkimer, Delaware, Scoharie, Ulster, Chenango and Tioga Counties, in New York State.

MEETING OF DECEMBER 30TH, 1891.

Mr. Hogg in the chair and twenty-three persons present.

Miss Delia W. Marble and Mr. Robert Demcker were elected active members.

The paper of the evening, "Friendly Bacteria," was then given by Prof. Herbert W. Conn, of the Wesleyan University.

ANNUAL MEETING, JAN. 12, 1892.

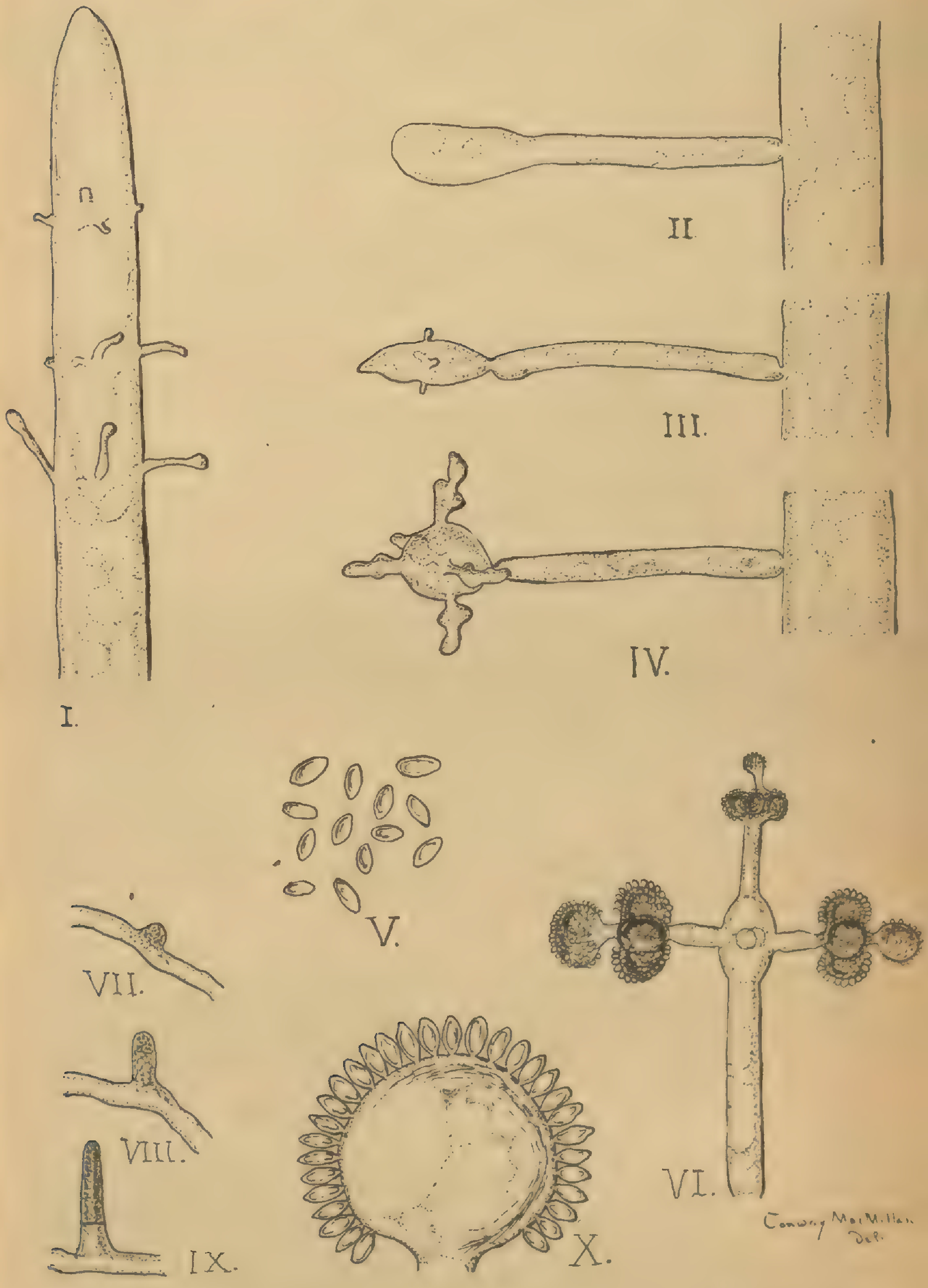
The President in the Chair and twenty-three persons present.

Reports of officers for the past year were read and accepted.

The following officers were elected for the year 1892: President, Hon. Addison Brown; Treasurer, Henry Ogden; Recording Secretary, Maria O. Steele; Corresponding Secretary, E. P. Bicknell; Librarian, Maturin L. Delafield, Jr.; Curator, Josephine E. Rogers; Editor, N. L. Britton; Associate Editors, Emily L. Gregory, Anna M. Vail, C. Henry Kain, Henry H. Rusby, Arthur Hollick.

The election of Vice-President was deferred until the first February meeting.

The announced paper of the evening was read by Mr. John K. Small on "The Flora of Western North Carolina and contiguous territory," copiously illustrated by specimens.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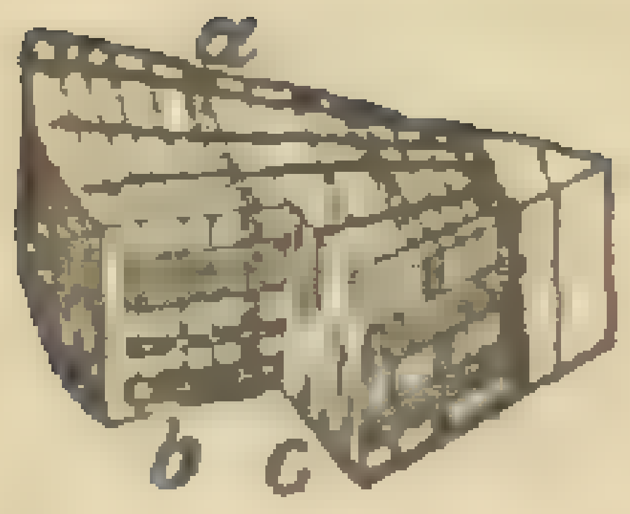

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Undescribed plants from Guatemala. VIII, IX. (with plates I–II, XVI–XVIII) *John Donnell Smith.* 1, 191
On certain new or peculiar North American Hyphomycetes. I, II. (with plates III–IV, XIX–XX) *Roland Thaxter.* 14, 201
New grasses . . . . . . *Geo. Vasey.* 26
Notes on the apical growth of Osmunda and Botrychium (with plate V.) . . *Douglas H. Campbell.* 37
Two new plants from the Cascade Mountains (with plate VI.) . . . . *B. L. Robinson.* 43
New species of Montana fungi (with plates VII and X) *J. B. Ellis and F. W. Anderson.* 45, 85
A key to the North American genera of Labiatæ *Alfred C. Stokes.* 49
Black rust of cotton: a preliminary note *Geo. F. Atkinson.* 61
Flowers and insects. VI. . . *Charles Robertson.* 65
Notes on technique. II. . *James Ellis Humphrey.* 71
A contribution to the life history of Hydrastis Canadensis (with plate VIII.) . . . . *Homer Bowers.* 73
Two undescribed species of Apodanthes (with plate IX.) *B. L. Robinson.* 82
New or noteworthy Compositæ from Guatemala *John M. Coulter.* 95
Notes on North American willows. VI. *M. S. Bebb.* 102
Notes on the flora of the St. Croix region *E. J. Hill.* 108, 126
On raised peat-bogs in New Brunswick *W. F. Ganong.* 123
A visit to the West Indies . . *A. S. Hitchcock.* 130
Notes on the apical growth of Liverworts (with plate XIII) *David M. Mottier.* 141

Some new Solanaceæ from Guatemala *John M. Coulter.* 144
New grasses . . . . . *George Vasey.* 145
Abnormal phyllotactic conditions as shown by the leaves or flowers of certain plants (with plate XIV) *Aug. F. Foerste.* 159
A study of some anatomical characters of North American Gramineæ. I, II, III. (with plates XV, XXI–XXIV) *Theo. Holm.* 166, 219, 275
On the organization of the fossil plants of the Coal-measures . . . . . *David White.* 172
On the relation between insects and the forms and characters of flowers . . . *Thomas Meehan.* 176
Notes on North American mosses *Charles Reid Barnes.* 205
Notes on Uredineæ . . . . *J. C. Arthur.* 225
A sketch of the flora of Orono, Me. *F. Lamson-Scribner.* 228
The Future of Systematic Botany *John M. Coulter.* 243
Botanical papers at the Washington meeting of the A. A. A. S. 255
Botanical Club of the A. A. A. S. 261
The Botanical Section of the American Association of Agricultural Colleges and Experiment Stations *Geo. F. Atkinson.* 264
On the structure and dimorphism of Hypocrea tuberiformis (with plate XXV) . *Geo. F. Atkinson.* 282
Notes on the flora of Canada . *James M. Macoun.* 285
What the station botanists are doing *Byron D. Halsted.* 288
The sling-fruit of Cryptotænia Canadensis *E. J. Hill.* 299
Bacteria of the melons . . *Byron D. Halsted.* 303
Noteworthy anatomical and physiological researches *Conway MacMillan.* 305, 343
On the relationships of the Archegoniata *Douglas H. Campbell.* 323
A new herbarium pest . . . *C. V. Riley.* 334
Notes upon Peronosporeæ for 1891 *Byron D. Halsted.* 338
New plants collected by W. G. Wright in Western Mexico . . . . . *B. L. Robinson.* 340

Table of Contents.

BRIEFER ARTICLES—

Actinella (Hymenoxis) Texana, n. sp. *John M. Coulter* and *J. N. Rose.* 27
Anæsthetics and transpiration . . . *Conway MacMillan.* 28
Observations on Notholæna Nealleyi and Pringle's no. 1864,'88 *Geo. E. Davenport.* 53
Sarcodes sanguinea . . . . *Thos. Meehan.* 54
Erythræa Pringleana, n. sp. . . . . *Veit Wittrock.* 85
A new Aster from California (with plate XI.) . . *J. N. Rose.* 113
A new Fomes from northern Montana (with plate XII.) *F. W. Anderson.* 113
Silphium laciniatum . . . . . . *B. L. Robinson.* 114
The propagation of Ranunculus lacustris . . *Chas. A. Davis.* 115
Cornus Baileyi in Oregon . . . . . . *Walter H. Evans.* 118
Simple mechanism to show geotropism . *Goodwin D. Swezey.* 147
Notes from Columbus, O. . . . . . *Aug. D. Selby.* 148
Continuity of the protoplasm in the Chantransia-form of Batrachospermum (*illust.*) . . . . *Bradley M. Davis.* 149
A method of studying the growth of tubers *Conway MacMillan.* 149
A monstrous form of the common field daisy . *B. W. Barton.* 150
A suggestion on the proper terminology of the spermaphytic flower *Conway MacMillan.* 178
A curious case of germination in Citrus decumana *W. G. Farlow.* 179
Coursetia axillaris, n. sp. . . *John M. Coulter* and *J. N. Rose.* 180
Penetration of the host by Peronospora gangliformis (*ill.*) *W. H. Rush.* 208
Notes on the pollination of Helianthus . . . *Walter H. Evans.* 234
An abnormal water pore (*illust.*) . . . . . . *C. R. B.* 235
A new grass . . . . *Geo. Vasey.* 235
Fasciation in Cnicus lanceolatus (*illust.*) . . *J. W. Toumey.* 236
A new Eriogynia. Notes . . . . . . *Wm. M. Canby.* 236
Oligonema . . . . *Sereno Watson.* 267
A neglected Spartina . . . . *Geo. Vasey.* 292
Pentstemon Haydeni, n. sp. . . . . . . *Sereno Watson.* 311
A remarkable orange tree . . . . *W. Whitman Bailey.* 311
Helianthus mollis . . . . *Thomas Meehan.* 312
Further notes on the mutilation of flowers by insects *Jacob Schneck.* 312
A new Ravenelia from Alabama . . . . *Geo. F. Atkinson.* 313
Cleistogamy in Polygonum acre (*illust.*) . *T. H. Kearney, Jr.* 314
Mutilation of the flower of Tecoma radicans . *Jacob Schneck.* 314
Atriplex corrugata, n. sp. . . . . . . *Sereno Watson.* 345
Sterile flowers of Panicum clandestinum . *Thos. A. Williams.* 346
Peculiar forms of proliferation in timothy (with plate XXVI.) *J. W. Tuomey.* 346
Iris hexagona . . . . *W. E. Andrews.* 347

EDITORIAL—

Themes for independent investigation, 28.—Misleading analogies, 55.—"What original work shall I do?" 86.—The utilitarian side of botany, 119.—A caution as to nomenclature, 151.—Indiana "reading circle" botany, 180.—The three months' course in botany, 180.—The opportunities of the Botanical Club, A. A. A. S., 209.—Revised terminology, 238.—Nomenclature and authority, 267.—Ignorance of plant physiology, 293.—The division of the section of biology of the A. A. A. S., 315.—Volume XVI. in retrospect, 347.

OPEN LETTERS—

The word "biology" . . . . ——— ——— 32
Labeling specimens for the herbarium . . *Wm. E. Andrews.* 33
Mounting plants . . . . *W. J. Beal.* 57
Last words on "biology" . . . . . . ——— ——— 89
Pocket edition of Gray's Manual . . . . . *Aug. D. Selby.* 90
Mounting plants . . . . *M. S. Bebb.* 121
To phytographers . . . . *P. A. Saccardo.* 153
A plea for better botanical specimens . . . . *L. H. Dewey.* 187
Pachystima Canbyi in cultivation . . . . *Geo. C. Woolson.* 187
The Manchester group of botanists . . . . . *J. C. Arthur.* 215
Monomialism . . . . *L. H. Bailey.* 215
The home of Calypso . . . . *F. Blanchard.* 241
What name shall be used? What is authority? *Conway MacMillan.* 272
Where is the home of Calypso? . . . . . *Chas. V. Piper.* 296
Botanical clubs in California . . . . . *Willis L. Jepson.* 296
Nomenclature from the practical standpoint . . . *E. L. Rand.* 318

CURRENT LITERATURE—(about 70 works reviewed).

NOTES AND NEWS—(nearly 200 items).

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12440 var. Curtissii, Vasey.
12441 gracillimus, Scrib.
12442 heterolepis, Gray.
12443 *Indicus, R. Br.*
12444 interruptus, Vasey.
12445 Jonesii, Vasey.
12446 junceus, Kunth.
12447 minor, Vasey.
12448 Nealleyi, Vasey.
12449 purpurascens, Hamil.
12450 Sacatilla, Griseb.
12451 serotinus, Gray.
12452 Texanus, Vasey.
12453 tricholepis, Torr.
12454 vaginæflorus, Vasey.
12455 var. tenerus, Vasey.
12456 Virginicus, Kunth.
12457 Wolfii, Vasey.
12458 Wrightii, Munro.
STENOTAPHRUM 8061
12459 Americanum, Schk.
STIPA 8090
12460 Andersoni, Vasey.

THURBERIA 8116
12486 Arkansana, Benth.
TRACHYPOGON 8017
12487 polymorphus, Hack., var. Montufari, Hack.
TRAGUS 8029
12488 *racemosus, Hall.*
TRICHLORIS 8164
12489 pluriflora, Fourn.
12490 verticillata, Fourn.
TRIODIA 8207
12491 acuminata, Vasey.
12492 albescens, Munro.
12493 ambigua, Vasey.
12494 Americana, (Beauv.)
12495 avenacea, HBK.
12496 Buckleyana, Vasey.
12497 cuprea, Jacq.
12498 eragrostoides, V. & S.
12499 grandiflora, Vasey.
12500 mutica, Scrib.
12501 Nealleyi, Vasey.
12502 pulchella, HBK.
12503 var. parviflora, Vasey.
12504 purpurea, Hack.

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CONTENTS:

PAGE.
Review of the North American Species of the Genus *Xyris*: Plate CXXIV., *Heinrich Ries* 35
Eastern and Western Weeds: *Byron D. Halsted* 43
Piperaceae Bolivianae: *Casimir De Candolle* 47
BOTANICAL NOTES. Note on *Polygala* 50
REVIEWS OF FOREIGN LITERATURE. — Revisio Generum Plantarum vascularium omnium atque cellularium multarum secundum Leges Nomenclaturae internationales 50
RECENT LITERATURE RELATING TO AMERICAN BOTANY. Additions and Corrections to the artificial keys to Genera and Species of North American Mosses; Catalogue of the Phaenogamous and vascular Cryptogamous Plants in the vicinity of St. Louis, Mo.; The Classification of Dracaenas; Diseases of Trees likely to follow Mechanical Injuries; Flora Brasiliensis, Bromeliaceae; Flora Franciscana, Part II.; Flora of the Olympics; Mosses from the Pribilof Islands, Behring Sea; [illegible] [illegible]; New Species and Notes of Utah Plants; Revue [illegible] des Espèces du Genre [illegible]; The Life-history of [illegible] [illegible]; and minor notices ..... [illegible]
PROCEEDINGS OF THE CLUB ..... [illegible]

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Vol. XIX.] New York, February 10, 1892. [No. 2.

Review of the North American Species of the Genus Xyris.

By Heinrich Ries.

Plate CXXIV.

While engaged in a study of this genus during the past winter, I found great confusion existing among the various species. The most complete list of the North American species thus far published is in Chapman's Flora of the Southern States; but even here the descriptions are hardly sufficiently accurate, and all the species cannot be maintained. It has therefore seemed to me desirable to present this revision of the genus, the arrangement of which is based on specimens in the herbarium at Harvard College, Agricultural Department at Washington, and those of Messrs. J. D. Smith, W. M. Canby, as well as the herbarium of Columbia College. The majority of the species are confined to the Southern States. The genus may be defined as follows:

Perennial, stemless herbs. Roots usually fibrous, sometimes bulbous. Leaves linear or linear-lanceolate, collected about the base of the naked scape. Scales convex, horny, thicker in the middle. Flowers single in the axils of the scales, which are collected into a more or less dense spike. Sepals three, the two lateral ones glumaceous and keeled, enclosing a third membranous one. Petals three, clawed. Stamens six, three of which are fertile and situated on the claws of the petals, the alternate ones being sterile. Anthers linear. Ovary one-celled, three-valved; the valves bearing the placenta along the middle. Stigma one, style three-cleft. The modifications of the keel of the lateral sepals form valuable specific characters.

A. Sheath of scape longer than the leaves.

1. XYRIS BREVIFOLIA, Michx.

X. brevifolia, Mich. Fl. Bor. Amer. i. 23 (1803).

Scape terete, smooth, occasionally spirally twisted and 4-12 inches high. Leaves linear, narrow, edges smooth, 1-3 inches long; spikes globose, light brown; scales usually lacerate on the outer margin, oblong; wingless keel of lateral sepals very slightly crenulate.

Florida.—Jacksonville, A. H. Curtiss, No. 3,000; St. Augustine, W. M. Canby, 1869; Tampa, J. D. Smith; Herb. Dr. Chapman; Indian River, Ed. Palmer, No. 576; Apalachicola, B. F. Saurman; Manatee, A. P. Garber, F. Cozzans, Dr. Bacon; De Land, G. D. Hulst (1891); Lloyd's, L. H. Lighthipe (1891); Lake Winnemissett, G. D. Hulst (1891).

2. XYRIS FLABELLIFORMIS, Chapm.

X. flabelliformis, Chapm. Fl. S. U. S. 498 (1860).

X. scirpoides, Chapm. Mss. in Herb. Col. Coll.

X. brevifolia, *β subcarinata*, Chapm. Mss. in Herb. Col. Coll.

Scapes slender, usually spirally twisted, 4-12 inches high, clustered; leaves linear-lanceolate to linear, short, spreading; spikes globose to oblong, few flowered; bracts light brown, angular, their margins entire; lateral sepals shortly cut-fringed on the wingless keel.

Florida.—Ex. Herb. S. T. Olney; Herb. Col. Coll.; Hibernia, W. M. Canby; Manatee Co., J. T. Rothrock; Jacksonville, A. H. Curtiss, No. 3,001.

B. Sheath of scape shorter than leaves.

* Narrowly winged keel of lateral sepals fringed with hairs.

3. XYRIS AMBIGUA, Beyr.

X. ambigua, Beyr. in Kunth, Enum. iv. 11 (1843).

X. stricta, Chapm. Fl. S. U. S. 498 (1860).

X. rhombipetala, Sauv. Fl. Cub. 160 (1868).

Scape rigid, slightly twisted, furrowed, two-edged above, 2-3 feet high; leaves linear-lanceolate, 6-12 inches long, smooth and shining; spikes ovate-lanceolate, oblong or cylindric, generally acute, sometimes obtuse, many-flowered; bracts convex, light brown; lateral sepals lanceolate, shining, the upper two-thirds of the narrowly winged keel fringed and tapering at both ends.

X. stricta, Chapm. is undoubtedly the same as *X. ambigua.* Dr. Chapman speaks of the leaves of the former as being rough-edged, while those of the latter are smooth. I am unable to find such a difference. Again the heads of *ambigua* are said to be oblong, ovate-lanceolate or acute, while those of *stricta* are oblong or cylindric. The heads of *ambigua* are often obtuse and cylindric, while those of *stricta* are sometimes acute. I can find no constant difference in the shape of the sepals.

In *X. rhombipetala*, Sauv. the shape of the sepal and whole form of the plant are the same as in *ambigua.*

North Carolina.—Wilmington, W. M. Canby.

South Carolina.—Society Hill, M. A. Curtis; Sumter Co. J. D. Smith.

Florida.—Apalachicola, A. H. Curtiss, No. 3,002; Walton Co., A. H. Curtiss, No. 16; Chapman.

Texas.—Wright, Herb. Harvard Coll.; Hempstead, E. Hall, No. 671; Hardin Co., G. C. Nealley (1884); Austin, F. Rugel.

4. XYRIS FLEXUOSA, Mühl.

X. jupicai, Michx. Fl. Bor. Amer. i. 23 (1803). ?
X. *flexuosa*, Mühl. Cat. 5 (1813).
X. bulbosa, Kunth, Enum. iv. 11. (1843).
X. scabra, Engelm. Mss. in Herb. Col. Coll.

Scape twisted, straight or spiral, two-edged above; root somewhat bulbous; leaves linear, twisted; spike globose, few flowered; lateral sepals linear, curved, fringed the whole length of the wingless keel.

New Hampshire.—Jefferson Highlands, T. G. White.

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Massachusetts.—Salem, J. W. Chickering, Jr.

New York.—Herkimer Co., J. A. Paine; Cold Spring, Long Island, H. Ries.

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Pennsylvania.—Chester Co., in Herb. W. M. Canby (1865); C. W. Short (1842).

Delaware.—Newcastle, Herb. W. M. Canby.

Maryland.—Stockton, H. H. Rusby.

District of Columbia.—Washington, L. F. Ward; Holmead Swamp, G. Vasey.

North Carolina.—Wilmington, W. M. Canby.

Texas.—Henderson Co., J. D. Smith; Choctaw Agency, J. M. Bigelow; Hempstead, E. Hall, No. 673; Cypress City, G. Belt, No. 756, (1876); Tex. Flor. Exs. No. 186; Hardin Co., G. C. Nealley, (1884).

Arkansas.—Southwest Arkansas, F. L. Harvey, No. 133.

Illinois.—Mason Co., E. Hall; Dixon, G. Vasey.

Wisconsin.—Marquette Co., J. Townley.

** The winged keel of the lateral sepals toothed or fimbriate.

5. XYRIA MONTANA, n. sp.

Scape slender, 3-12 inches high, straight and twisted, two-edged above; roots fibrous; leaves linear, 2-6 inches long, spikes globose to ovoid, scales rounded, upper margin finely fimbriate, lateral sepals linear, the upper third of the winged keel irregularly serrate-fimbriate.

This plant has been called *X. flexuosa* var. *pusilla*, A. Gray, Man. Ed. 5, p. 548 (1868). The name *pusilla*, however, belongs to a previously discovered species from New Holland.—R. Br. Prodr. Fl. Aust. 256 (1810).

Small specimens of *X. flexuosa* have been erroneously referred to this.

Localities thus far known are:

Pocono Mt., Pa., Traill Green, T. C. Porter, 1876; Base of White Mts., A. Gray; Herkimer Co., N. Y., J. A. Paine; High Bogs, Westchester Co., N. Y., Hoysradt; Eagle Harbor, Keweenaw Co., Mich., Robbins; Leverett, Mass., H. G. Jesup; Pine Barrens of New Jersey, Torrey; Open Swamps, Akron, Ohio, C. Mohn; Salem, Mass., J. H. Sears; Quaker Bridge, N. J.

6. XYRIS ELLIOTTII, Chapm.

X. ELLIOTTII, Chapm. Fl. S. U. S. 498 (1860).

Scape slender, twisted, straight, two-edged throughout the greater part of its length; leaves linear, twisted, 2-8 inches long. the upper two-thirds of the leaf a darker shade of brown than the lower third, spikes ovate, scales lacerate on the upper margin, lateral sepals lanceolate, the winged keel incised-fimbriate.

Florida.—Jacksonville, A. H. Curtiss, No. 3105; Dr. Chapman, 1860; C. F. Powell; Miami, A. P. Garber, No. 287, 1877; Tampa, J. D. Smith; St. Augustine, Herb. Harv. Coll.; Apalachicola, B. F. Saurman, 1867.

7. XYRIS COMMUNIS, Kunth.

X. communis, Kunth, Enum. iv. 10. (1843).
X. difformis, Chapm. Fl. S. U. S., 500 (1860).
X. gymnoptera, Griseb. Cat. Pl. Cub. 223 (1866.)
X. partita, Chapm. Mss. in Herb. Col. Coll.

Scapes straight, twisted, two-edged above, one-angled below, leaves linear to linear-lanceolate, 4-12 inches long; spikes many-flowered, ovate or round; margin of scale usually smooth; lateral sepals lanceolate, the upper two-thirds of the winged keel fimbriate.

X. difformis, Chap., is the same as *X. communis*, Kunth, the sepals and whole appearance of the two plants being alike.

The comparisons of *communis* and *gymnoptera* with *difformis* were based on C. Wright, Cuba, No. 3734; Eggers, St. Domingo, No. 2101, det. by Dr. Urban, at Berlin; Sintenis, Porto Rico, 6764 and 934, det. by Urban, and Turckheim, Guatemala, No. 201, det. by J. D. Smith.

Maryland.—Salisbury, W. M. Canby.
South Carolina.—Aiken, H. W. Ravenel.
Florida—Dr. Chapman; Mayport, H. D. Keeler.
Louisiana.—Opelousa, G. W. Letterman.
Alabama.—Lee Co., J. D. Smith.

8. XYRIS SEROTINA, Chapm.

X. serotina, Chapm. Fl. S. U. S, 500 (1860).
X. fascicularis, Chapm. Mss. in Herb. Col. Coll.

Scape straight, twisted, striate, 2-edged above and 1-1½ feet high; leaves linear-lanceolate, surface papillose, wide, spikes ovoid or globose, scales rounded, lateral sepals linear, upper third of keel-wing incised-fimbriate.

Florida.—Apalachicola, A. W. Chapman, 1861.

There are some small specimens in the Columbia College Herbarium, collected by Dr. Hale in Louisiana. The leaves are 1-2 inches long; scape 3-5 inches high. The sepals are those of *serotina* and the leaves show the papillose surface, characteristic of *serotina*, near the base. They are probably young plants of this species.

9. XYRIS CAROLINIANA, Walt.

X. Caroliniana, Walt. Fl. Car. 69 (1788).
X. elata, Chapm. Fl. S. U. S. 501 (1860).
X. serotina, var. Chapm. Mss. in Herb. Col. Coll.
X. graminifolia, Chapm. Mss. in Herb. Col. Coll.

Scapes solitary or clustered, twisted and two-edged above, 1-2 feet high; leaves linear or linear-lanceolate, 4-15 inches long; spikes globose or ovate, or sometimes oblong; scales brown, becoming curled and the margin lacerated with age; lateral sepals linear, the upper third of the narrowly winged keel incised-serrate.

Forms found in New England agree with Dr. Chapman's type of *elata*, and if this species could be maintained would extend its range. This, however, seems doubtful, as forms intermediate between *Caroliniana* and *elata* exist, and show that the two pass into each other.

Massachusetts.—Uxbridge, J. W. Robbins, 1885; Waltham, T. Morong; Milton Co., W. Boott, 1871.

Rhode Island.—Cumberland, R. I. plants No 834, in Herb. Col. Coll.; East Greenwich, J. W. Congdon, 1878.

New York.—Pine Plains, Hoysradt; Long Island, Wading River, E. S. Miller, 1877.

New Jersey.—Pine barrens, A. Gray; Manchester, T. C. Porter; Forked River, N. L. Britton; J. Macnab, No. 183.

Delaware.—Sandy swamps, Herb. Col. Coll., 1861; Ellendale, 1874.

Maryland—Snow Hill and swamps E. Maryland, W. M. Canby; Stockton, H. H. Rusby.

North Carolina.—Henderson Co., J. D. Smith; Wilmington, in Herb. Harv. Coll.

South Carolina.—Greenville Co., J. D. Smith; Santee Canal, W. Ravenel; Society Hill, M. A. Curtis.

Florida.—Chapman; Tampa, A. P. Garber.

Alabama.—A. Winchell.

Louisiana.—Dr. Hale.

10. XYRIS IRIDIFOLIA, Chapm.

X. iridifolia, Chapm. Fl. S. U. S. 501 (1860).
X. rigida, Chapm. Mss. in Herb. Col. Coll.
X. conifera, Chapm. Mss. in Herb. Col. Coll.

Scape stout, straight, two-edged and flattened above, 1½-3 feet high; leaves broadly linear, with acuminate points, 1–2 feet long; spike oval or oblong, many-flowered; scale dark, margin entire, brown, thick, convex and becoming more so with age; lateral sepals rather short, linear, thin, the winged keel irregularly incised-fimbriate throughout its length.

Florida.—A. W. Chapman.

Alabama.—Buckley; Gadsden, G. R. Vasey.

South Carolina.—Santee Canal, Ravenel.

Texas.—Houston, E. Hall, No. 674; mouth of Brazos River, F. Lindheimer.

11. XYRIS PLATYLEPIS, Chapm.

X. platylepis, Chapm. Fl. S U. S. 501 (1860).

Scapes straight, twisted, two-edged above, 1½–3 feet high; leaves linear, lanceolate, pointed, somewhat twisted, 9–15 inches long; spikes cylindric or oval, obtuse or acute and often loosely flowered in the older specimens; scales orbicular, the lateral margins curling backward with age; lateral sepals long, narrow, the upper half of the narrowly winged keel serrate.

South Carolina.—Aiken, H. W. Ravenel, No. 4 and No. 3, 1866; Charleston, A. H. Curtiss.

Florida.—Jacksonville, A. H. Curtiss, No. 3011; Apalachicola, B. F. Saurman.

12. XYRIS FIMBRIATA, Ell.

X. fimbriata, Ell. Bot. S. Ca. and Ga. i. 51 (1816).

Scapes straight, twisted, two-edged above, 2–4 feet high; leaves long, broadly linear, with acuminate point, 1–2 feet long; spikes cylindric or globose, many-flowered; scales wider above the middle, margin entire; lateral sepals somewhat long, linear, long-fimbriate above the middle.

New Jersey.—Quaker Bridge, C. F. Parker, 1866; Atsion, C. F. Parker; Pine barrens, J. D. Smith.

South Carolina.—Society Hill, M. A. Curtis.

Florida.—J. H. Simpson.

Virginia.—Dismal Swamp, T. Morong.

Alabama.—Mobile, C. Mohr.

Mississippi.—Mississippi City, J. D. Smith.

13. XYRIS TORTA, Smith.

X. torta, Smith, in Rees Encycl. (1819).

X. conocephala, Sauv. Fl. Cub. 159 (1868).

Scapes spirally twisted, 1–2 feet high, one-edged; roots bulbous, shining; leaves linear, twisted, 6–15 inches long; spikes cylindric, pointed; scales light brown, twice as long as wide, the apex serrulate; lateral sepals long, linear, exserted, the upper portion of the keel-wing short-fimbriate.

New Jersey.—Quaker Bridge, D. C. Eaton, 1860.

North Carolina.—G. McCarthy, No. 12½.

South Carolina.—Florence, J. D. Smith, No. 233; Society Hill, M. A. Curtis.

Georgia.—Columbus, J. D. Smith, 1883.

Florida.—Mayport, H. D. Keeler; Key West, Blodgett; Apalachicola, B. F. Saurman; Tampa, A. P. Garber, No. 20, 1876, white flowers; Jacksonville, A. H. Curtiss, No. 3013.

Louisiana.—Dr. Gates.

Texas.—Hempstead, E. Hall.

* * *Leaves filiform.

14. XYRIS BALDWINIANA, R. & S.

X. Baldwiniana, R. & S. Mant. i. 351 (1822).

X. tenuifolia, Chapm. Fl. S. U. S. 502 (1860).

X. setacea, Chapm. Fl. S. U. S. 500 (1866).

X. juncea, Baldw. in Ell. Bot. S. C. i. 53 (1816) not R.Br.

X. stenophylla, Chapm. Mss. in Herb. Col. Coll.

Scape slender, straight and twisted, 6–15 inches high; leaves filiform, hollow, 4–8 inches long, twisted and acute; spikes globose or oval; scales round, outer margin usually lacerate; lateral sepals linear, the upper half of keel-wing serrate.

South Carolina.—Society Hill, M. A. Curtis, 1852.

Florida.—Walton Co., A. H. Curtiss, No. 3015; Apalachicola, B. F. Saurman, 1867; Indian River, E. Palmer, No. 577.

Louisiana.—Dr. Hale.

Alabama.—Mobile, C. Mohr.

Texas.—Hempstead, E. Hall, No. 672; Hardin Co., G. C. Nealley, June 1884.

DESCRIPTION OF PLATE CXXV.

1. *X. brevifolia*, Michx. Scale × 7. Sepal × 9
2. *X. flabelliformis*, Chapm. Scale × 9. Sepal × 9.
3. *X. ambigua*, Beyr. Scale × 3. Sepal × 4.
4. *X. flexuosa*, Mühl. Scale × 5. Sepal × 6.
5. *X. montana*, n. sp. Scale × 7. Sepal × 7.
6. *X. Elliottii*, Chapm. Scale × 5. Sepal × 6.
7. *X. communis*, Kunth. Scale × 6. Sepal × 9.

8. *X. serotina*, Chapm. Scale × 6. Sepal × 6.
9. *X. Caroliniana*, Walt. Scale × 6. Sepal × 5.
9a. *X. elata*, Chapm. Sepal × 10. Scale × 9.
10. *X. iridifolia*, Chapm. Scale × 5. Sepal × 6.
11. *X. platylepis*, Chapm. Scale × 5. Sepal × 7.
12. *X. fimbriata*, Ell. Scale × 5. Sepal × 6.
13. *X. torta*, Smith. Scale × 3. Sepal × 3.
14. *X. Baldwiniana*, R. & S. Scale × 6. Sepal × 8.

Eastern and Western Weeds.*

BY BYRON D. HALSTED.

The following remarks are founded upon the reports of a large number of botanists and crop growers throughout the United States, received in response to letters sent to them or questions asked through the public press. Having lived for four years in Iowa and being now a resident of New Jersey, the weeds of these two States have received personal consideration, and therefore these widely separated States will furnish a basis for a comparison of the weeds of the East and the West, not being unmindful of the fact that Iowa represents the central part of our continent, while the West, strictly speaking, reaches beyond the Sierras.

An elaborate list of the weeds of Iowa was published in a bulletin from the Agricultural College in 1888. In this catalogue 297 species were enumerated and classified as follows.

	Annuals.	Biennials.	Perennials.	Total.
Worst Weeds	28	6	17	51
Bad Weeds	34	12	48	94
Indifferent Weeds	22	9	121	152
Total	84	27	186	297

In passing from the worst weeds through the middle class to the indifferent the percentage of perennials rapidly increases.

The eighty-seven foreign species are tabulated as follows:

	Worst.	Bad.	Indifferent.	Total.
Annuals	18	19	7	44
Biennials	3	6	3	12
Perennials	7	12	12	31
Total	28	37	22	87

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* Read before the S. P. A. S., Washington, D. C., August 19th, 1891.

The foreign species of the New Jersey list are classified as given below:

	Worst.	Bad.	Indifferent.	Total.
Annuals	21	33	15	69
Biennials	5	10	5	20
Perennials	10	19	12	41
Total	36	62	32	130

It will be seen that there are forty-three more weeds in the New Jersey than in the Iowa list. The increase is mostly among the worse and bad sorts. It will also be observed that half of the New Jersey weeds are foreigners, while for Iowa only much less than one-third.

Turning now to the natives, the Iowa list gives two hundred and ten (210) distributed as follows:

	Worst.	Bad.	Indifferent.	Total.
Annuals	10	16	14	40
Biennials	3	6	6	15
Perennials	10	35	110	155
Total	23	57	130	210

In contrast with this stands the New Jersey list:

	Worst.	Bad.	Indifferent.	Total.
Annuals	9	11	16	36
Biennials	2	5	6	13
Perennials	8	20	58	86
Total	19	36	80	135

There are fifty less of the indifferents, and nearly all of these are among the perennials.

These general summarized facts are not so easy to grasp as particular cases, and therefore we will glance at some of the species. Those of the Iowa list not found in New Jersey are mostly of the third class weeds, native in large part to the prairie, and as a rule quickly disappear when the land is placed under cultivation. Such for example are the lead plant (*Amorpha canescens*), milk vetch (*Astragalus Canadensis*), false indigo (*Baptisia leucophæa*) and button-snake root (*Eryngium yuccæfo-*

lium. To this group belong a large number of the sunflower family, as several asters, solidagos, the compass plant (*Silphium laciniatum*), four species of cone flower (*Echinacea* and *Rudbeckia*), a few sunflowers proper (*Helianthus*), artemesias and hawkweeds (*Hieracium*). The verbenas, especially *V. stricta* and *V. bracteosa*, are missed in the East, and the mountain mint (*Pycnanthemum lanceolatum*) and wild bergamot (*Monarda fistulosa*) do not prevail in waste land in New Jersey. Among the borrages the false gromwell (*Onosmodium Carolinianum*) and the puccoon (*Lithospermum canescens*) common to Iowa do not appear in the New Jersey list, neither do several of the smart-weeds (*Polygonum*).

If we look at the additions made for the eastern list we find present many of the standard weeds; thus wild radish (*Raphanus Raphanistrum*), a rank pepper grass (*Lepedium campestre*) and the turnip (*Brassica campestris*), escaped from cultivation, white melilot (*Melilotus alba*), vetch or tare (*Vicia sativa*), and live for ever (*Sedum Telephium*), are common pests to New Jersey. The button weed (*Diodia teres*) and teasel (*Dipsacus sylvestris*) are not overlooked also, and in the great weed family (Compositæ) wild feverfew (*Chrysanthemum Parthenium*), elecampane (*Inula Helenium*) and salsify (*Tragopogon porrifolius*) figure largely in New Jersey but not in Iowa. Pennyroyal (*Hedeoma pulegioides*) and horehound (*Marrubium vulgare*) are two of the eastern weeds that take the place of some mints that are in the western list. While there are several weedy Ipomœas, the *I. pandurata* or man-of-the-earth is one that will balance several of the same family in the Iowa flora. The goosefoots are numerous in species in the East, and in place of the three for Iowa there are not less than six in New Jersey. There is also a doubling of the number of Amaranths or pigweeds. One of the worst eastern weeds with an equal representative in Iowa is the wild onion (*Allium vineale*), and its own sister the wild leek (*Allium tricoccum*) is a pest also in New Jersey. Among the grasses New Jersey is plagued with, the Bermuda grass (*Cynodon Dactylon*) and two cheats (*Bromus racemosus* and *B. tectorum*) are above what Iowa can claim as pests; while one sedge called nut-grass or coco-grass (*Cyperus rotundus*) is becoming a greater pest each year in the eastern fields.

In short the New Jersey list can be made up from the one for Iowa by omitting seventy-five (75) of the native prairie plants, mostly perennials, and adding forty-three (43), a large percentage of which are annuals. The only single weed of the first rank stricken from the Iowa list in adapting it for New Jersey is a species of pigweed, but even this within the last year has been found within the latter State. On the other hand there are several first class weeds that are added in the adoption of the western list to the east. Of such, for example are: a pepper grass, the wild radish, two kinds of cocklebur, feverfew, wild onion, wild leek, nut-grass, Bermuda grass, and a kind of chess, or a total of ten of the worst weeds.

That which is true of New Jersey and Iowa likewise holds good for the whole East compared with the whole West. The East is overrun with a larger number of the most aggressive weeds; weeds that assert their ability to resist the forces of the cultivator and plant their banners upon the tilled ground, likewise annual weeds that stock the soil with a multitude of seeds, ready to spring into life whenever an opportunity offers.

Some species of weeds are found everywhere from Maine to California, as *Chenopodium album*, *Amarantus retroflexus*, *Xanthium Canadense*, *Plantago lanceolata*, *Capsella Bursa-pastoris*, and *Portulaca oleracea*. There are others prominent on the Pacific Coast and not elsewhere, as the *Hordeum murinum*, *Silybum Marianum*, and *Malva borealis*. Likewise there are weeds peculiar to the Rocky Mountain region, as the *Iva axillaris*, *Franseria tomentosa*, while on the prairies, especially in Kansas and Nebraska, the following head the list: *Cenchrus tribuloides*, *Asclepias Syriaca*, *Solanum rostratum* and *Helianthus annuus*. In the middle prairie States it is mostly the members of the sunflower family, as the ragweeds and cockleburs, that prevail.

Coming into the central States the list is led by Canada thistle, quackgrass, docks, daisy, chess, plantain, and purslane. If to this list we add wild carrot, onion and parsnip, and the like old foreign enemies, we have the extensive catalogue of these plants pests that prey upon the lands of New England.

Of the weeds of the South as compared with those of the North it has not been the purpose here to speak, nor of the migration of weeds.

Piperaceæ Bolivianæ.

By Casimir DeCandolle.

Piper, L.

Sectio III Steffensia, C. DC. (*in Prodr. v.* 16, 1, *p.* 251).

2576

P. psilophyllum, foliis modice petiolatis ovatis basi ima æquali subacutis utrinque glabris, nervo centrali vix ad ⅓ longitudinis nervos utrinque 4-5 adscendentes quorum infimos fere e basi mittente, petiolo glabro basi vaginante, pedunculo quam petiolus fere triplo breviore glabro, amento ipso maturo quam limbus parum breviore, bracteæ palta triangulari margine hirsuta pedicecelloque hirsuto, baccæ subtetragonæ glabræ vertice in sicco 4-5 anguloso.

In Bolivia ad Undavi, altid. 8,000 ped. (Rusby n. 2186).

Ramuli glabri læves, amentiferi 3 millim. crassi. Limbi in sicco firmo-membranacei subopaci crebre pellucido-punctulati, ad 16 centim. longi ad 9 centim. lati, apice in specimine detriti. Petioli 15 millim. longi. Pedunculi ad 5 millim. longi. Amenta matura 7 millim. crassa, 12 centim. longa. stamina 4. Species *P. obovati* Ruiz et Pav. (Flor. Per. 1 p. 36, Tab. 53 f. b.) affinis limborum forma ab eo recendens.

P. Mapirense, foliis breviter petiolatis elliptico-lanceolatis basi æquali vel subæquali acutis apice obtusiuscule acuminatis supra glabris subtus ad nervos subtillime puberulis, nervo centrali circiter ad ½ longitudinis nervos utrinque 4-5 subadscendentes alternos mittente, petiolo glabro basi ima vaginante, pedunculo glabro petiolum æquante, amento ipso limbum circiter æquante, bracteæ vertice triangulari-truncato margine subtiliter ciliolato, bacca glabra.

In Bolivia ad Mapiri, altitud. 2,500 ped. (Rusby n. 2180).

Ramuli glabri læves ad nodos vix tumidi. Limbi in sicco membranacei opaci crebre pellucido-punctulati circiter 10 centim. longi 5 centim. lati. Petioli 1 centim. longi. Amenta matura 3 millim. crassa. Stamina 4, antheris rotundatis parvis filamenta circiter æquantibus.

Species *P. Oaxacani*, C. DC. (in Prodr. l. c. p. 274) affinis limborum forma ab eo discrepans.

P. Rusbyi, foliis brevissime petiolatis oblongo-lanceolatis basi leviter inæquali acutis apice longiuscule acute acuminatis supra scabriuscule polosulis subtus parce pilosulis, nervo centrali ultra

⅓ longitudinis nervos adscendentes utrinque 4 mittente, pedunculo glabro petiolum pluries superante, amento ipso florente limbi dimidium circiter æquante, bracteæ pelta triangulari margine ciliolata.

In Bolivia prope Yungas, altitud. 4,000 ped. (Rusby n. 2188).

Ramuli glabri albido-punctulati, amentiferi circiter 2 millim. crassi. Limbi in sicco membranacei virescentes adopectu haud pellucido-punctulati 13 centim. longi 4½ centim. lati. Petioli vix 3 millim. longi. Pedunculi 2½ centim. longi. Amenta apice mucronulata, florentia circiter 2 mill. crassa in sicco pallida fuscescentia. Stamina 4.

Species *P. chimonanthifolii*, Kunth (olim) proxima petiolis brevioribus ramulisque glabrioribus ab eo discrepans.

P. OXYPHYLLUM, foliis brevissime petiolatis ovato-lanceolatis basi subæquali rotundato-cordatis apice longiuscule acute acuminatis mucronulatisque utrinque pubescentibus et ad nervos longe pilosis, nervo centrali circiter ad ½ longitudinis nervos adscendentes utrinque 5 quorum supremos ab aliis remotos mittente, petiolo villoso basi ima vaginante, pedunculo villoso petiolum pluries superante, amento ipso florente quam limbus pluries breviore, bracteæ inferne latæ subcucullatæ dorso hirsutæ apice acute et anguste triangulari cornosulo hirsuto.

In Bolivia prope Yungas, altitud. 4,000 ped. (Rusby n. 2176).

Ramuli juniores longe subochraceo-villosi, amentiferi circiter 2 mill. crassi. Limbi in sicco membranacei grisei subopaci pellucido-punctulati circiter 17 centim. longi vix 5 centim. lati. Petioli 8 millim. longi. Pedunculi 3 centim. longi. Amenta nondum omnino evoluta circiter 4 centim. longa apice breviter mucronata. Stamina 4, antheris ovato-subacutis filamenta circiter æquantibus.

Species *P. Dasypodi*, C. DC. (in Prodr. l. c. p. 304) affinis.

PEPEROMIA, RUIZ ET PAV.

P. NUDICAULIS, foliis alternis modice petiolatis ellipticis basi acutis apice obtusis emarginulatisque utrinque glabris inconspicue 5-nerviis amentis terminalibus filiformibus folia pluries superantibus modice pedunculatis subdensifloris, bractea orbiculari, ovario emerso apice obtuso oblique stigmatifero stigmate minuto.

In Bolivia prope Yungas (Bang n. 331 a).

Glabra inter muscos crescens caulibus erectis 10-12 centim. longis inferne radicantibus in sicco 1 millim. crassis. Limbi in sicco membranacei subpellucidi subtus haud dense nigro-punctulati circiter 13 millim. longi et 8 millim. lati. Petioli 2 millim. longi. Pedunculi circiter 1 centim. longi. Amenta florentia in sicco 1 millim. crassa.

Species P. *Caldasianae*, C. DC., (in Linn. v. 3, n. f. p. 365). affinis, caulibus glaberrimis et ovario apice obtuso ab ea discrepans.

R. RUSBYI, foliis oppositis breviter petiolatis lanceolatis basi et apice acutis utrinque glabris 5 nerviis, amentis apice caulis 2, axillaribus pedunculatis ipsis folia fere triplo superantibus densifloris, bractea ovato-rotunda, ovario subimmerso oblongo-ovato, stigmate terminali carnosulo papillosulo, bacca oblongo-ovata.

In Bolivia prope Yungas, altitud. 6,000 ped. (Rusby n. 2214).

Glabra inter muscos crescens caulibus erectis inferne radicantibus in sicco tetragonis. Limbi in sicco coriacei opaci ad 5 centim. longi circiter 5 millim. lati, inconspicue 5-nervii, nervo centrali subtus prominente, cæteris subtilioribus. Petioli circiter 5 millim. longi. Pedunculi 1 centim. longi. Amenta florentia in sicco circiter 2 millim. crassa. Bacca in sicco basi rhachi impressa.

Species *P. tetragonæ*, Ruiz et Pav. Flor. Peruv. v. 1, p. 31, tab 47. affinis sed foliis multo minoribus ab ea distincta.

P. BANGII, foliis quaternis longiuscule petiolatis lanceolatis basi et apice acutis utrinque glabris 3-nerviis, amentis axillaribus terminalibusque longiuscule pedunculatis folia circiter triplo superantibus, bractea ovato-rotunda, ovario immerso.

In Bolivia prope Yungas (Rusby n. 330 a).

Erecta, glabra, caulis in sicco coriaceus 5 millim. crassus, ramuli erecti ad 20 centim. longi. Limbi in sicco firmo-opaci crebre pellucido-punctulati. Nervi. subtus prominuli. Petioli circiter 1 centim. longi. Pedunculi ad 2½ centim. longi. Amenta florifera in sicco 3 millim. crassa. Bractea pedicellata. Ovarium ovatum superne haud contractum apice imo stigma carnosulum gerens.

Species *P. Victorianæ*, C. DC. Prodr. l. c. p. 449 affinis, ab ea foliis minoribus et in sicco crassioribus cauleque haud alato recedens.

MISSOURI
BOTANICAL
GARDEN.

Botanical Notes.

Note on Polygala. In the January BULLETIN, p. 32, in noting Dr. Wheelock's recent paper on *Polygala* (MEMOIRS, Vol. ii. No. 4) we tried to correct a printer's blunder in the spelling of *P. ovatifolia*, A. Gray. What we tried to say and what we now again endeavor to point out is that No. 36, on p. 148, should be *P. ovatifolia*, A. Gray and not *P. ovalifolia*, A. Gray, as printed. The spelling of *P. ovalifolia*, DC. on p. 149 is uniformly correct. In the key to the species, both this and *P. Californica*, No. 33, are correct.

Reviews of Foreign Literature.

Revisio Generum Plantarum vascularium omnium atque cellularium multarum secundum Leges Nomenclaturæ internationales, cum Enumeratione Plantarum Exoticarum in Itinere Mundi collectarum. Otto Kuntze. (8vo. 2 volumes, pp. clxvix. 1011. Leipzig, London, Milan, New York and Paris, 1891).

In the course of Dr. Kuntze's extensive travels in all parts of the world since the year 1874, he accumulated a collection of plants aggregating 7706 numbers. In the subsequent study of this great amount of material, carried on principally in the Herbaria at Berlin and at Kew, he was confronted with the problem of determinating on the system of nomenclature he should adopt for them. He wisely decided to adhere strictly to the principles of priority laid down by the Paris Congress of botanists, and his results are now given to the world in the two fine volumes before us. In addition to the elaboration of his own collections, he undertook an even more extensive work, and one of very much more general importance. He decided to investigate the status of every generic name in use, and to point out the oldest available one for every genus recognized by him, visiting for this object the most extensive and complete botanical libraries in Europe. It is interesting to note in this connection that he found the Library of the British Museum of Natural History superior to all others.

The chapters of this book treat of; I. An Itinerary of his travels; II. A criticism of Durand's "Index Generum Plantarum;"

III. An account of the errors in that work; IV. Pfeiffer's "Nomenclator Botanicus," V. Linnæus' relations with his contemporaries; VI. The changes of names made by Linnæus and his contemporaries; VII. Instability of Nomenclature from the time of Linnæus to the end of the eighteenth century; VIII. Considerations on the founding of generic names; IX. Changes of names by the elevation of sections to genera and for linguistic reasons; X. Homonyms, a cause of the changing of names and a lasting source of instability in nomenclature; XI. The simultaneous appearance of publications and the incompleteness of libraries; XII. Bentham and Hooker's "Genera Plantarum;" XIII. Convenience as a hindrance to the acceptance of correct names; XIV. Linnæus' "Systema Naturæ," Edition 1., as the beginnning of generic nomenclature; XV. Suggested modifications of the international laws of nomenclature of 1867; XVI. Pritzel's "Thesaurus Literaturæ Botanicæ;" XVII. Modern English nomenclature; (this chapter written in English, and especially interesting to English botanists). Then follows a list of the plants collected by the author, with all generic priorities in the entire vegetable kingdom which he has ascertained, this occupying the greater part of the book.

We have neither leisure nor space to satisfactorily present the arguments advanced and the general results arrived at in this great work. It must be in the hands of every working botanist, whether he agree with the author wholly or in part. The changes in names which he proposes are for the most part based on perfectly sound principles, and will, no doubt, be widely accepted. We think it a great mistake to go back to the first edition of Linnæus' Systema for generic names, and believe that the first edition of his "Genera Plantarum" of 1737 to be the most satisfactory point of departure. It is to be noted that Dr. Kuntze has no sympathy with citing authors older than the Linnæan time, remarking that a fixed basis is essential for the beginning of nomenclature, which is just the position I have repeatedly taken. I consider the argument for the "Systema" of 1735 as not convincing, while the reasons for the "Genera" of 1737 are entirely satisfactory.

As to the citation of species and their authors he has an entirely new method to propose. He would write, for example, *Castalia odorata*, Greene (L.), that is, to cite the original author of the specific name behind the author of the binomial. Just what is to be gained by this method over the one so widely in vogue of reversing this arrangement and writing *Castalia odorata* (L.) Greene, is not obvious. Indeed the appearance of this book will, I believe, tend to bring the method of the American Ornithologists and other zoologists into increasing favor, and cause many to write *Castalia odorata* (L.), which method Dr. Kuntze stigmatizes as false and " often used by modesty or by negligence or by fear of responsibility." However, if this is not employed, and there is a general acceptance of the generic names pointed out by the author as having priority, it will necessitate writing Kuntze (contracted to OK by Dr. Kuntze) after surely not less than 25,000 specific names, a positively fearful thing for Americans to contemplate.

While we consider that Dr. Kuntze has gone too far in beginning his nomenclature with the Linnæan Systema of 1735, we do not think that he has gone quite far enough in other directions. He has not accepted the important principle that a name once used for an organism ought to be applicable to that and to no other, the doctrine of " once a synonym always a synonym," which would effectually prevent the instability of nomenclature due to homonyms; he has not accepted specific names identical with generic, making here an exception to his otherwise stringent rules of priority, and while he accepts the idea of priority of place being as important as priority of time, it is only with important modifications, which do not appear to me to have any sound basis. The only rule that can be effective in this matter must be one without exceptions, if we are to arrive at fixed results.

Dr. Kuntze's chapter on the dates of publication of the writings of the older authors is worthy of the closest attention. It supplies information which only a favored few have at their command, and for which he will have the lasting gratitude of botanists generally for years to come.

The principal changes suggested for the generic names of North American plants are appended. I have annotated a few of them. It should be stated that in all cases which I have had time to examine I find his dates and facts entirely correct.

POLYPETALÆ.

Clematitis, L. (1735)=*Clematis*, L. (1737).

This comes from going back to the Systema Plantarum of 1735, which I do not think desirable.

Helleborodes, Ludw. (1737), Adans. (1763), *Eranthis*, Salisb. (1807).

Beurera, Ehret (1755)=*Calycanthus*, L. (1759).

Badianifera, L. (1749)=*Illicium*, L. (1759).

Tulipifera, Ludw. (May, June, 1737)=*Liriodendron*, L. (Oct. 1837).

Cebatha, Forsk. (1775)=*Cocculus*, DC. (1818).

Leuconymphæa, Ludw. (1737)=*Castalia*, Salisb. (1805).

Bicuculla, Borkh. (1797)=*Adlumia*, Raf. (1808).

This I consider unavailable because *Bicuculla* was used by Adanson in 1763 for species of *Diclytra*. Rafinesque's name should stand, in my opinion.

Capnodes, Ludw. (1737)=*Neckeria*, Scop. (1777)=*Corydalis*, DC. (1805).

In the BULLETIN, vol. xviii. 265, I noted that *Neckeria*, Scop. antedates *Corydalis*, DC., but I was not then aware that *Capnodes* had been used for the genus within the Linnæan time.

Capnorchis, Ludw. (1737)=*Bicuculla*, Adans. (1763)=*Diclytra*, Borck. (1797).

Mosenthinia, Kuntze=*Glaucium*, Mill. (1737), non *Glaux*, L.

Dr. Kuntze regards *Glaux* and *Glaucium* as the same word, and so renames the latter in honor of his sister and her husband.

Alyssum, L. The American species which have long been known as *Vesicarias* and which Dr. Sereno Watson has separated as *Lesquerella*, are referred to this genus, at least those which have come to the author's notice. He does not allude to Dr. Watson's paper. (Proc. Amer. Acad. xxiii., 249-255 1888).

Coulterina, Kuntze=*Physaria*, Nutt. (1838), not *Physarium*, Pers. (1795), the latter a genus of Fungi. The name is in honor of President John M. Coulter. As Mr. Rose has already dedicated to him a genus *Coulterella* (Contr. U. S. Nat. Herb. No. iii. 71, 1890) in Compositæ, it is unlikely that the one here proposed will be maintained. If two names of different gender, such as *Physaria* and *Physarium*, cannot stand, it seems logical that two genera should not stand for the same person.

Bursa, Guettard (1747)=*Capsella*, Med. (1792).

The name of Shepherd's Purse becomes *Bursa pastoris*.

Cardamine, L. (1735)=*Nasturtium*, R. Br. (1813).

Erysimum, L. (1735)=*Arabis*, L. (1737).

Nasturtium, L. (1735)=*Lepidium*, L (1737).

Hesperis, L. (1735)=*Sisymbrium*, L. (1737).

The unnecessary mischief of going back to the Systema Plantarum of 1735 is well illustrated by these four citations. It overturns several hundred specific names in very closely related genera, and, so far as I can see, has absolutely nothing to be said in its favor. Herr Kuntze includes *Streptanthus*, Nutt. in *Erysimum* (*Arabis*).

Gansbium, Adans. (1763)=*Erophila*, DC. (1821).

Both names are based on *Draba verna*, L. and if this species is to be kept generically distinct from the other *Drabas*, Adanson's name has priority over that of De Candolle.

Dipetalia, Raf. (1836)=*Oligomeris*, Camb. (1838).

Calceolaria, Lœfl. (1758)=*Pombalia*, Vand. (1771)=*Ionidium*, Vent. (1803.)

Calceolaria was applied to the Scrophulariaceous genus generally so known, by Jussieu in 1759.

Buda is adopted instead of *Tissa*, on the ground that species were first associated with that generic name, although *Tissa* has priority of place. I have pointed out that *Corion*, Mitch. (1748) is probably equivalent to these names of Adanson (see Journ. Bot. xxix. 303). I presume that Dr. Kuntze would not accept *Corion*, however, on account of the previous publication of *Coris*. L.

Stellularia, L. (1748)=*Stellaria*, L. (1753).

Dr. Kuntze does not seem to have noticed that this is also *Alsine*, L. (1737). *Stellaria*, Ludw. (1737) is *Callitriche*, L. (1748).

Lasianthus, Adans. (1763)=*Gordonia*, L., Ellis (1771).

Abutiloides, Sieg. (1736)=*Modiola*, Mœnch. (1794).

This is one year before the Genera Plantarum.

Malache, Trew. (1750)=*Pavonia*, Cav. (1786).

Malveopsis, Presl. (1844)=*Malvastrum*, A. Gray (1849).

Pentagonocarpos, Targ. (1748)=*Kosteletzka*, Presl (1831).

Sphæroma, DC. (1824)=*Sphæralcea*, St. Hil. (1825).

This was first published as a section of *Malva*. Dr. Kuntze maintains that this is equivalent to publication as a genus, and I now think, wisely, although I have not been hitherto willing to accept this view.

Acetosella, Mœhr. (1736)=*Oxalis*, L. (1737).

This is one year before the Genera Plantarum.

Elemifera, L. (1738)=*Amyris*, P. Br. (1756).

Azedarach, L. (1735)=*Melia*, L. (1737).

The name comes in by going back to the Systema.

Iliciodes, Dum. (1802)=*Nemopanthes*, Raf. (1819).

Lupulus, Mill. (1739)=*Gouania*, Jacq (1763).

Pavia, L. (1735)=*Esculus*, L. (1737)=*Æsculus*, L. (1753).

Pawia is the correct orthography according to Kuntze, and is the name to be adopted if we go back to the Systema.

Toxicodendron, L. (1735)=*Rhus*, L. (1737).

A Systema name.

Acuan, Med. (1786)=*Desmanthus*, Willd. (1805).

This name not being latin, the author latinizes it into *Acuania*.

Anil, Ludw. (1737)=*Indigofera*, L. (1738).

Kuntze latinizes this to *Anila*.

Bradburya. Raf. (1817)=*Centrosema*, DC. (1825).

This is taken up from the description, the clue having evidently been furnished by Dr. Watson's Bibliographical Index. Rafinesque's description is based wholly on Robins' account of two leguminous plants, one climbing, the other erect, in his "Voyages dans l'Interieur de la Louisiane," iii. 503, 504 (1807). Rafinesque saw no specimens, and while his *Bradburya* may be based on *Centrosema Virginianum*, as well as on any other plant of the same character, there is no certainty about it, unless Robins' specimen can be turned up. *Centrosema*, DC. was published as a section of *Clitoria* in 1825; the equivalent *Cruminium*, Desv. as a genus in 1826.

Brittonamra, Kuntze=*Cracca*, Benth. not L.

Cacara, Rumpf. (1745-'7)=*Pachyrhizus*, Rich. (1825).

Cæsalpinioides, L. (1738)=*Gleditsia*, L. (1742).

Corallodendron, L. (1735)=*Erythrina*, L. (1737).

This is a Systema name.

Cracca, L. (1747)=*Tephrosia*, Pers. (1807).

Emerus, Burm. (1737)=*Sesban*, Adans. (1763).

Falcata, Gmel. (1791)=*Amphicarpa*, Ell. (1818).

This is in my view unavailable, because *Falcata* was used by Rivinus, in Rupp's Flora Jena, Ed. 2 (1745) for species now referred to *Medicago*. *Amphicarpa*, Ell. (Sept. 1818) appears to be antedated a few months by *Amphicarpon*, Raf. (Jan. 1818), and has been changed to *Xypherus*, Raf. Journ. Phys. lxxxix. 260. (1819).

Fevilléea, L. (1735), not L. 1737=*Inga*, Scop. (1777)=*Zygia*, P. Br. (1756).

This is another Systema name which should not be taken up. Kuntze further proposes to include in it *Albizzia*, Duraz., *Pithecolobium*, Mart., *Annesleya*, Salisb., *Enterolobium*, Mart., and *Calliandra*, Benth., in which we feel perfectly confident that he will not be supported.

Ichthyomethia, P. Br. (1756)=*Piscidia*, L. (1759).

This has already been pointed out by Prof. Hitchcock, in a recent number of "Garden and Forest."

Kuhnistera, Lam. (1789)=*Petalostemon*, Michx. (1803).

Lotodes, Sieg. (1736)=*Psoralea*, L. (1742).

This date is one year in advance of the Genera Plantarum.

Medica, L. (1735)=*Medicago*, L. (1737).

A Systema name.

Meibomia, Möhr. (1736); Heist. (1748)=*Desmodium*, Desv. (1813).

Patagonium, Schrank (1808)=*Adesmia*, DC. (1825).

Phaseolodes, Mill. (1737)=*Kraunhia*, Raf. (1808)=*Wistaria*, Nutt.

Sertula, L. (1735)=*Melilotus*, L. (1737).

A Systema name.

Speisia, Neck. (1790)=*Oxytropis*, DC. (1802).

Stizolobium, P. Br. (1756)=*Mucuna*, Adans. (1763).

Ternatea, L. (1735)=*Clitoria*, L. (1737).

A Systema name.

Tragacantha, L. (1735)=*Astragalus*, L. (1737).

Another Systema name.

Basilima, Raf. (1815)=*Sorbaria*, Ser. (1825)=*Schizonotus*, Lindl.

Already pointed out by Professor Greene (Fl. Fran. 57, Mar. 30, 1891).

Dryadæa, L. (1735)=*Dryas* (1737).

Filipendula, L. (1735)=*Ulmaria*, Ludw. (1737).

Systema names.

Luetkea, Boug. (1831)=*Eriogynia*, Hook. (1833).

Opulaster, Med. (1799)=*Physocarpus*, Camb. (1824).

Schizonotus, Raf. (1836)=*Holodiscus*, Maxim.

Already discussed by Professor Greene, in Pittonia ii. 65-67, where it is maintained that Lindley's *Schizonotus*, (1830), nullifies the homonym of Rafinesque.

Therofon, Raf. (1828)=*Boykinia*, Nutt. (1834), not Raf. (1825).

Stellaria, Ludw. (1737)=*Callitriche*, L. (1748).

Chytraculia, P. Br. (1756)=*Calyptranthes*, Sw. (1788).

Murtughas, L. (1747)=*Lagerstræmia*, L. (1759).

Antogæringia, Kuntze=*Stenosiphon*, Spach. (1835), not *Stenosiphonium*, Nees. (1832).

Isnardia, L. (Beginning of 1837)=*Ludwigia*, L. (End of 1837).

Papaya, L. (1735)=*Carica*, L. (1737).

A Systema name.

Cactus, L. (1735)=*Mamillaria*, Haw. (1812), not Stackh. (1809). =*Melocactus*, Ludw. (1737).

This is the Systema application of *Cactus*, and in my opinion should not be taken up. The application of *Cactus* in the Genera Plantarum is probably principally to *Opuntia*.

Halimus, Rumpf. (1748-50)=*Sesuvium*, L. (1759).

Adorium, Raf. (1825)=*Musenium*, Nutt. (1840).

Anidrum, Neck. (1790)=*Bifora*, Hoffm. (1816).

Deeringia, Adans. (1763)=*Cryptotænia*, DC. (1829).

Written *Deringa* by Adanson, corrected as above by Kuntze.

Myrrhodes, Moehr. (1736), Sieg. (1737)=*Anthriscus*, Pers. (1805).

Ptilimnium, Raf. (1818)=*Discopleura*, DC. (1829).

Uraspermum, Nutt. (1818)=*Osmorrhiza*, Raf. (1819). Nuttall's name is not available, because *Urospermum* was used by Scopoli in 1777 for a genus of Compositæ, and in my view *Osmorrhiza* should stand.

Echinopanax, Dec. & Pl. (1854)=*Fatsia*, Dec. & Pl. (1854). The first has priority of place.

GAMOPETALÆ.

Caprifolium, L. (1735)=*Lonicera*, L. (1737).

A Systema name.

Obolaria, Sieg. (1736)=*Linnæa*, Gronov. (1737).

This is a year previous to the Genera Plantarum.

Caruelina, Kuntze=*Chomelia*, Jacq. (1763), not L.

Matthiola, L. (1737)=*Guettarda*, L. (1753).

Richardia, L. (1737)=*Richardsonia*, Kunth.

Uragoga, L. (1737)=*Cephaelis*, Sw.

Kuntze puts in here *Psychotria*, L. (1759), noting that it is antedated by *Psychotrophum* and *Myrstiphyllum* of P. Browne (1456); also *Palicourea*, Aubl. *Mapouria*, Aubl., and *Rudgea*, Salisb.

Actinea, Juss. (1803)=*Actinella*, Pers. (1807).

Adopogon, Neck. (1790)=*Krigia*, Schreb. (1791).

Agoseris, Raf. (1817)=*Troximon*, Nutt. (1813), not Gærtn. (1891). See Greene, Pittonia, ii. 176.

Amellus, P. Br. (1756)=*Melanthera*, Rohr. (1792).

Aromia, Nutt. (1840)=*Amblyopappus*, H. and A. (1841).

Cacalia, Burm. (1737)=*Vernonia*, Schreb. (1791).

Carelia, Mœhr. (1736)=*Ageratum*, L. (1737).

Name a year older than the Genera Plantarum.

Ceratocephalus, Burm. (1737)=*Spilanthes*, Jacq. (1763).

Coleosanthus, Cass. (1817)=*Brickellia*, Ell. (1824).

Crassina, Scepin (1758)=*Zinnia*, L. (1759).

Diplogon, Raf. (Jan. 1818)=*Chrysopsis*, Nutt. (1818).

Dr. Kuntze has not been able to find a copy of the "American Monthly Magazine" in Europe.

Distasis, DC. (1836)=*Chætopappa*, DC. (1836).

Both published in the Prodromus. The former has priority of place.

Ecliptica, Rumpf. (1750)=*Eclipta*, L. (1771).

Dr. Kuntze passes Burmann's name *Eupatoriophalacron* (1837) over because it is more than six syllables long.

Eriophyllum, Lag. (1816) = *Bahia*, Lag. (1816).

The former has priority of place and if the two genera are to be united should stand as the name.

Gærtnera, Med. (1785) = *Franseria*, Cav. (1793).

Heleniastrum, Mill. (1739) = *Helenia*, L. (1737) = *Helenium*, L. (1753) not L. (1735).

This mixture comes from starting with the Systema, the *Helenium* of that work being *Inula*, L. (1747). I contend that *Helenia* and *Inula* should be maintained.

Hieracioides, Mœhr. (1736) = *Crepis*, L. (1737).

Name a year in advance of the Genera Plantarum.

Lacinaria, Hill (1762) = *Liatris*, Schreb. (1791).

Mauchia, Kuntze = *Bradburya*, T. and G. (1814), not Raf. (1817).

Psilostrophe, DC. (1839) = *Riddellia*, Nutt. (1841).

Ridan, Adans. (1763) = *Actinomeris*, Nutt. (1818).

Adanson wrote it Ridan; Dr. Kuntze latinizes it to *Ridania*.

Rothia. Lam. (1792) = *Hymenopappus*, Willd. (1803).

Name not available in my view on account of *Rothia* having been used by Schreber in 1791 for another Composite.

Schlectendalia, Willd. (1803) = *Adenophyllum*, Pers. (1807).

Selloa, Spreng. (1819) = *Gymnosperma*, Less. (1832).

Thyrsanthema, Neck. (1790) = *Chaptalia*, Vent. (1800).

Willoughbya, Neck. (1790) = *Mikania*, Willd. (1803).

Dortmanna, L. (1735) = *Lobelia*, L. (1737).

A Systema name.

Pentagonia, Mœhr. (1736); Sieg. (1737) = *Specularia*, Heist. (1748).

Adnaria, Raf. (1817) = *Gaylussacia*, H. B. K. (1818).

This is taken from the description.

Azalea, L. (1735) = *Chamærhodendros*, Kram. (1742) = *Rhododendron*, L. (1753).

Azalea is also described in the Genera Plantarum of 1737, and if the two are to be united it should be under this name.

Brossea, L. (1737) = *Gaultheria*, Kalm. (1751).

Chamæcistis, Œder (1761) = *Loiseleuria*, Desv. (1813) = *Azalea*, Hall (1742).

Chamædaphne, Catesby (1740-43)=*Kalmia*, L. (1751).

Erica, L. (1737)=*Calluna*, Salisb. (1802).

Ericodes, Mœhr. (1736)=*Erica*, L. (1753), not L. 1737, which is *Calluna*, Salisb.

Mœhring's name is a year in advance of the Genera Plantarum. The next name appears to be *Tetralix*, Hall. (1742).

Hydragonum, Sieg. (1736)=*Cassandra*, Don. (1834).

Name a year ahead of the Genera Plantarum.

Pseva, Raf. (1809)=*Chimophila*, Pursh. (1814).

Monotropsis, Schwein. (1817)=*Schweinitzia*, Ell. (1818).

Pterosporopsis, Kell.=*Sarcodes*, Torr. (1853), not *Sarcodum*, Lour. (1790).

Anonymos, Gronov. (1739)=*Galax*, L. (1753).

Limonium, Mœhr. (1736), Ludw. (1737)=*Statice*, Willd. (1809).

Statice is, however, in Linnæus' Genera of 1737.

Statice, Mœhr. (1736), Ludw. (1737)=*Armeria*, Willd. (1807), not L. (1735).

Meadia, Catesby (1748)=*Dodecatheon*, L. (1751).

Nummularia, Gron. (1739)=*Steironema*, Raf. (1820).

Tinus, Burm. (1737)=*Ardisia*, Sw. (1788).

Lyciodes, L. (1738)=*Bumelia*, Sw. (1788).

Eugeniodes, L. (1747)=*Symplocos*, L. (1762).

Adelia, P. Br. (1756)=*Forestiera*, Poir. (1811).

Centaurodes, Mœhr. (1736)=*Centaureum*, Hall (1745)=*Erythræa*, Neck. (1790).

Mœhring's name is a year ahead of the Genera Plantarum. *Centaureum* is unavailable on account of the Linnæan *Centaurea*, and so I think Necker's name (spelled first *Erithrea*), should stand.

Nymphodes, Ludw. (1737)=*Limnanthemum*, Gmel. (1769).

Shultzia, Raf. (1808)=*Obolaria*, L. (1737), not Sieg. (1736), which is *Linnæa*, Gron.

Siegesbeck's name is a year older than the Genera Plantarum and for that reason not to be brought in, in my opinion.

Tetragonanthus, Gmel. (1769)=*Halenia*, Borck. (1796).

Armeria, L. (1735)=*Phlox*, L. (1737).

A Systema name.

Navarretia, R. & P. (1794)=*Gilia*, R. & P. (1794)=*Collomia*, Nutt.

The first of Ruiz and Pavon's names has priority of place over the second, and should be used if the genera are united.

Macrocalyx, Trew. (1761)=*Ellisia*, L. (1763).

Marilaunidium, Kuntze=*Nama*, L. (1759), not L. 1747.

Nama, L. (1747)=*Hydrolea*, L. (1762).

Cerinthodes, Ludw. (1737)=*Mertensia*, Roth. (1797).

Cynoglossospermum, Sieg. (1736)=*Lappula*, Hall. (1745)=*Echinospermum*, Lehm.

Haller's name is in my opinion the first available.

Lithocardium, L. (1735)=*Cordia*, L. (1737).

A Systema name.

Morelosia, Llav. & Lex. (1824)=*Bourreria*, P. Br. (1756), not *Beurera*, Ehret. (1755). *Bourreria* and *Beurera* are named for the same man.

Volvulus, Med. (1791)=*Calystegia*, R. Br. (1810).

Physalodes, Bœhm. (1760)=*Pentagonia*, Fabr. (1759)=*Nicandra*, Adans. (1763).

Dr. Kuntze does not use Fabricius' name here because Mœhring employed Pentagonia for a different plant in 1736. This is, however, a year ahead of the Genera Plantarum and in my view leaves *Pentagonia*, Fabr. free for this genus.

Adenostegia, Benth. (1836)=*Cordylanthes*, Nutt. (1846).

Afzelia, Gmel. (1791)=*Seymeria*, Pursh. (1814).

Capraria, L. (1737)=*Scoparia*, L. (1753).

Conradia, Nutt. (1834)=*Macranthera*, Torr. (1835).

Name not available on the principle "once a synonym always a synonym," for *Conradia* was employed by Martius in 1829 for another plant.

Fistularia, L. (1735)=*Rhinanthus*, L. (1737).

A Systema name.

Globifera, Gmel. (1791)=*Micranthemum*, Michx. (1803).

Monniera, P. Br. (1756)=*Herpestis*, Gærtn. (1805).

Stemodiacra, P. Br. (1756)=*Stemodia*, L. (1759).

Xuarezia, R. & P. (1794)=*Capraria*, L. (1753), not L. 1737.

Gelseminum, Weinm. (1742)=*Tecoma*, Juss. (1789). Not to be confounded with *Gelsemium*, Juss., which is a Loganiaceous genus.

Dyschoriste, Nees. (1832)=*Calophanes*, Nees. (1833).

Camara, L. (1735)=*Lantana*, L. (1737).
A Systema name.

Leptostachya, Mitch. (1848)=*Phryma*, L. (1751).

Agastache, Gronov. (1762)=*Lophanthus*, Benth. (1834).

Clinopodium, L. (1735)=*Calamintha*, Mœnch. (1794).

Glechoma, L. (1735)=*Nepeta*, L. (1737).
Systema names.

Hedyosmos, Mitch. (1748)=*Cunila*, L. (1803), not *Cunila*, L. (1737).

Kœllia, Mœnch. (1794)=*Pycnanthemum*, Michx. (1803).

Ladanum, L. (1735)=*Galeopsis*, L. (1737).
A Systema name.

Mesosphærum, P. Br. (1756)=*Hyptis*, Jacq. (1786).

APETALÆ.

Allionia, Loefl. (1758)=*Oxybaphus*, L'Her. (1797).

Xeræa, L. (1735)=*Gomphrena*, L. (1737).
A Systema name.

Allenrolfea, Kuntze=*Spirostachys*, S. Wats. (1874), not Sternb. (1866). Prof. Greene puts this into *Salicornia*.

Lerchea, Hall, (1751)=*Suæda*, Forsk. (1775).

Tithonia, L. (1735)=*Rivina*, L. (1737).
A Systema name.

Helxine, L. (1735 and 1737)=*Fagopyrum*, Gærtn.

Uvifera, L. (1738)=*Coccoloba*, L. (1759).

Benzoin, Ludw. (1737)=*Lindera*, Thunb. (1783).

Malapoenna, Adans. (1763)=*Tetranthera*, Jacq. (1797).

Lepargyrea, Raf. (Jan. 1818)=*Shepherdia*, Nutt. (End of 1818.)
See Greene, Pittonia, ii. 121.

Nestronia, Raf. (1836)=*Buckleya*, A. Gray (1843).

Ricinocarpus, Burm. (1737)=*Acalypha*, L. (1753), not *Acalypha*, L. (1737.)

Diasperus, L. (1735)=*Phyllanthus*, L. (1737).
A Systema name.

Ioxylon, Raf. (1817)=*Maclura*, Nutt. (1818).
See Greene, Pittonia, ii. 122.

Urticastrum, Mœhr. (1736), Heist. (1748)=*Laportea*, Gaud. (1826).

Ramium, Rumpf. (1747)=*Bœhmeria*, Jacq. (1763).

Adicea, Raf. (1815)=*Pilea*, Lindl. (1821).

Scoria, Raf. (1808)=*Carya*, Nutt. (1818).

I have already shown that *Scoria* is a misprint for *Hicoria*. (See Bull. Torr. Club, xv. 227). Dr. Kuntze does not seem to have seen my paper.

MONOCOTYLEDONES.

Helleborine, Martyn. (1736)=*Cathea*, Salisb. (1812)=*Calopogon*, R. Br. (1813).

Martyn's name is a year ahead of the Genera Plantarum. I think Salisbury's name should stand.

Neottia, L. (1735)=*Corallorhiza*, Ludw. (1737), R. Br. (1813).

A Systema name.

Diphryllum, Raf. (1808)=*Listera*, R. Br. (1813).

Limnodorum, Ludw. (1737)=*Cephalanthera*, L. C. Rich. (1818) =*Epipactis*.

Orchiodes, Trew. (1736); Sieg. (1737)=*Goodyera*, R. Br. (1813).

Gyrostachys, Pers. (1807)=*Spiranthes*, Rich. (1818)=*Ibidium*, Salisb. (1812).

Leptorchis, Thou. (1809)=*Liparis*, Rich. (1818).

Malaxis, Sw. (1788)=*Achroanthes*, Raf. (1808)=*Microstylis*, Nutt. (1818).

Heritiera, Gmel. (1791)=*Lachnanthes*, Ell. (1817).

Unavailable from my point of view, because *Heritiera* was used by Aiton in 1789 for a different plant.

Bermudiana, L. (1735)=*Sisyrinchium*, L. (1737).

A Systema name.

Gemmingia, Fabr. (1759)=*Belamcanda*, Adans. (1763).

Chrosperma, Raf. (1825)=*Amianthium*, A. Gray (1837).

Sabadilla, Brandt. & Ratzeb. (1836)=*Schœnocaulon*, A. Gray, (1837).

Tovaria, Neck. (1790)=*Smilacina*, Desf. (1798). *Tovara*, Adans., based on *Polygonum Virginianum*, dates from 1763, and interferes with the use of Necker's name.

Asphodeliris, Mœhr. (1736)=*Tofieldia*, Huds. (1778).

Name a year in advance of the Genera Plantarium.

Unifolium, Mœhr. (1736); Ludw. (1737) = *Maianthemum*, Wigg. (1780).

Schollera, Schreb. (1791) = *Heteranthera*, R. & P. (1794).

Juncodes, Mœhr. (1736); Sabbati (1745) = *Cyperella*, Kram. (1744) = *Luzula*, DC. (1805). Kramer's name is, in my opinion, from these citations the first available.

Washingtonia, Wendl. (1879) = *Pritchardia*, Seem. & Wendl. (1861), not Unger (1840). But *Washingtonia* was applied to *Sequoia gigantea* by Winslow in 1854, and is likely enough to be maintained as a genus at any time.

Spathyema, Raf. (1808) = *Symplocarpus*, Salisb. (1812). See Greene, Pittonia ii. 184.

Dupatya, Vell. (1825) = *Pæpalanthus*, Mart. (1833-'35).

Mariscus, Hall. (1742) = *Cladium*, R. Br. (1756).

Iria, Rich. (1805) = *Fimbristylis*, Vahl (1806). Published as a section.

Achyrodes, Bœhm. (1760) = *Lamarckia*, Mœnch (1794).

Bulbilis, Raf. (1819) = *Buchloë*, Engelm.

Campulosus, Desv. (1810) = *Ctenium*, Panz. (1813).

Capriola, Adans. (1763) = *Cynodon*, Rich. (1805).

Chamæraphis, R. Br. (1810) = *Setaria*, Beauv. (1812).

Chloropsis, Hack. (1887) = *Trichloris*, Fourn. (1881), not *Trichlora*, Baker (1877).

Corycarpus, Zea (1806) = *Diarrhena*, Beauv. (1812).

Dactylodes, Zan. (1742) = *Tripsacum*, L. (1759).

Hackelochloa, Kuntze = *Manisurus*, Sw. (1788), not *Manisurus*, L. (1771).

Hippagrostis, Rumpf (1749) = *Oplismenus*, Beauv. (1807).

Homalocenchrus, Mieg. (1768) = *Leersia*, Sw. (1788). See my note in Trans. N. Y. Acad. Sci. ix. 13 (1889).

Hystrix, Mœnch. (1794) = *Asprella*, Willd. (1809).

Manisuris, L. (1771) = *Rottbœllia*, L. f. (1779).

Nazia, Adans. (1763) = *Tragus*, Hall (1768).

Panicularia, Fabr. (1763) = *Glyceria*, R. Br. (1810).

Rhabdochloa, Beauv. Agrost. 84 (1812) = *Leptochloa*, Beauv. loc. cit. 71. Kuntze accepts *Rhabdochloa* because Beauvois described five species under that genus and only three under *Leptochloa*. The latter has priority of place, however, and in my opinion should be maintained.

Schmidtia, Tratt. (1816) = *Coleanthus*, Roem. & Schult. (1817).

Sieglingia, Bernh. (1800) = *Triodia*, R. Br. (1810).

Sorgum, L. (1735) = *Andropogon*, L. (1753).

This is a Systema name. *Schœnanthum*, Rumpf. (1747), would appear from Dr. Kuntze's citation to be the first name available after the Systema, if these grasses are to be regarded as congeneric.

Thalysia, L. (1735) = *Zea*, L. (1737). A Systema name.

GYMNOSPERMÆ.

Palmifolia, Trew (1752) = *Zamia*, L. (1763).

PTERIDOPHYTA.

Dryopteris, Amman (1739) = *Aspidium*, Sw. (1800).

Phyllitis, Sieg. (1736); Deering (1738) = *Scolopendrium*, Adans. (1763).

Pterinodes, Sieg. (1736) = *Filicastrum*, Amm. (1739) = *Struthiopteris*, Hall. (1842) = *Onoclea*, L. (1753).

Spicant(*a*), Hall. (1745) = *Lomaria*, Willd. (1809).

Calamistrum, L. (beginning of 1737) = *Pilularia*, L. (end of 1737).

Zaluziankya, Neck. (1775) = *Marsilea*, L. (1753), not *Marsilea*, L. (1737), which is said to be *Salvinia*.

Lycopodiodes, Dill. (1741) = *Selaginoides*, Dill. (1741) = *Selaginella*, Beauv. (1805).

Calamaria, Dill. (1741) = *Isoetes*, L. (1751).

BRYOPHYTA.

There appear to be no substitutions here that have not already been taken up. Most of them suggested are in Hepaticæ, and have been discussed by Professor Underwood in his paper on the North American plants of that order.

THALLOPHYTA.

The discussion of the treatment of Algæ, Fungi and Lichens we prefer to leave to others.

N. L. BRITTON.

Index to Recent Literature relating to American Botany.

Address at the Washington Meeting of the American Association for the Advancement of Science. George Lincoln Goodale. August, 1891 (reprint).

Artificial Keys to the Genera and Species of Mosses Recognized in Lesquereux and James' Manual of the Mosses of North America. Additions and Corrections by Charles R. Barnes. (Trans. Wisc. Acad. Sci. and Let. viii. 163-167, reprinted.)

These four pages of corrections are sufficient evidence that the keys are being used, and therefore serving the purpose they were intended for. We regret that in reprinting these corrections both sides of the paper should have been used, also that one important fact determined by me should have been omitted. In *Orthotrichum Douglassii* the stomata are superficial, as shown by the type preserved in Duby's collection in the Boissier Herbarium at Geneva, therefore the foot note on page 164 and correction for page 48 should be omitted. Copies of this sheet may be had by those having the keys, on application to the author accompanied by a two-cent stamp. E. G. B.

Bromeliaceen—Die von Bernoulli und Cario 1866-1878 *in Guatemala gesamelten.* L. Wittmack. (Engler's Bot. Jahrb. xiv. Beiblatt 32, 1891).

Æchmea Bernoulliana, A. Iguaua, Pitcairnia Carioana, Tillandsia remota and *T. Cucaënsis* are described as new.

Carnation Disease—The Specific Germ of the. J. C. Arthur. (Proc. Am. Ass. Ad. Sci. xxxix. 334).

Catalogue of the Phænogamous and Vascular Cryptogamous Plants in the Vicinity of St. Louis, Mo. Henry Eggert. (Pamph. 8vo. pp. 16).

This is a list of the plants growing within a radius of about forty miles around St. Louis. It is arranged alphabetically and about 1,100 species are enumerated, most of them observed by the author himself since 1874. *Parthenium repens*, Eggert, is described as new, with the following characters: "Low, 1 to 2 feet high, rough pubescent with spreading hairs, corymbosely branched above, the branches terminated by a loose cyme of rather few heads. Rootstock creeping, forming runners. April to

July." *Parthenium integrifolium* is stated to have the "stem below bulbously thickened, with many thickened root fibres." Hybrids are noted between *Vernonia Arkansana, V. fasciculata* and *V. Noveboracensis.* N. L. B.

Climate and Plants. L. H. Pammel. (Monthly Review of the Iowa Weather and Crop Service, ii. 6).

Continuity of Protoplasm through the Cell Wall of Plants. W. J. Beal and J. W. Toumey. (Proc. Am. Ass. Ad. Sci. xxxix. 332).

Development and Function of the So-called Cypress "Knees," together with a Short Consideration of the Natural Habitat of the Tree. W. P. Wilson. (Proc. Am. Ass. Ad. Sci. xxxix 329).

Development of the Sporocarp of Griffithsia Bornetiana. V. M. Spalding. (Proc. Am. Ass. Ad. Sci. xxxix. 327).

Diatoms—The Classification of. C. M. Vorce. (Am. Month. Mic. Journ. xii. 150).

This is a criticism of the paper by Rev. Frederick B. Carter on Diatoms: their Life-History and Classification, in which the writer refers to the omission of the genera *Actinocyclus, Amphiprora* and *Rhizœolenia.* He also expresses regret that the classification of H. L. Smith was not adopted rather than that given in the Micrographic Dictionary. C. H. K.

Diseases of Trees Likely to Follow Mechanical Injuries. W. G. Farlow. (Read before the Massachusetts Horticultural Society, March 7, 1891. Pamphlet 15 pages).

A brief untechnical explanation of the structure of a tree-trunk, with instructions for pruning, protecting and preventing the growth of fungi, and a plea for the planting and care of trees in towns and cities.

Distribution of Hepaticæ of North America. Lucien M. Underwood. (Proc. Am. Ass. Ad. Sci. xxxix. 298).

Distribution of the Trees, Shrubs and Vines of Jackson Co., Miss. B. F. Bush. (Kansas City Scientist, v. 161).

Euphorbia—On the Seed Coats of the Genus. L. H. Pammel. (Proc. Am. Ass. Ad. Sci. xxxix. 328.)

Ferns—George E. Davenport. Read before the Mass. Hort. Soc., March 28th, 1801. Reprint.

First Impressions of the Vegetation of British Guiana. David Paul. (Trans. Bot. Soc. Edin. xix. 170).

Flora Brasiliensis, Fasciculus CX. Bromeliaceæ, I. Carolus Mez.

This first part of the *Bromeliaceæ* of the Brazil Flora deals with the genera *Rhodostachys*, Phil., *Bromelia*, L., *Cryptanthus*, Kl., *Nidularium*, Lem., *Canistrum*, Morr., *Prantleia*, Mez. (new genus), *Aræococcus*, Brongn., *Hohenbergia*, Schult., *Wittmackia*, Mez. (new genus) and *Streptocalyx*, Beer. Many new species are described, and 12 plates illustrate the work.

Flora de Costa Rica—La. H. Polakowsky. Translated by Manuel Arago Peralta (Anales del Instituto fisico-geografico Nacional, San Jose de Costa Rica, ii. 1890).

Flora Franciscana, Part II. Edward L. Greene. (8vo. pp. 129-280. Issued Dec. 21st, 1891).

This continuation of Professor Greene's important work includes descriptions of the species and genera in twenty-four orders. A recapitulation of the principal novelties described and changes in nomenclature proposed is as follows: *Polygonum Kelloggii*, is a new species; *Emex australis*, Steinh. is an introduced Australian plant; *Eriogonum latifolium*, Smith (1815) replaces *E. arachnoideum*, Esch. (1826); *Eriogonum hirtiflorum*, A. Gray and *E. spergulinum*, A. Gray, are referred to *Oxytheca*; *Chenopodium carinatum* is an introduced species from Australia; *Monolepis Nuttalliana*, Greene, replaces *M. chenopodioides*, Moq. the former being the older specific name available; the genus *Spirostachys*, S. Wats., is referred to *Salicornia ;* four species described under *Claytonia* are transferred to *Montia ; Tillæa angustifolia*, var. *Bolanderi*, S. Wats., is raised to specific rank; *Saxifraga ranunculifolia*, Hook., is referred to *Boykinia*; *Œnothera grandiflora*, Ait., is maintained as a species; *Œ. arguta* and *Œ. hirtella*, are described as new; *Callitriche palustris*, L (1753) is taken up for *C. verna*, L (1755); *Ammannia humilis*, Michx. is retained in that genus, its reference to *Rotala* by Kœhne being questioned; *Mentzelia nitens* is a new species; the genus *Lesquerella*, S. Wats. is referred to *Physaria*, Nutt.; *Alyssum alyssoides* is the older specific name for *A. calycinum*; *Streptanthus Parryi*, *S. orbiculatus*, *S. Mildredæ* and *S. secundus* are described as new; *S. flavescens*, Hook., is transferred to *The-*

lypodium as *T. Hookeri* ; *Cardamine cardiophylla* is new, as are *Nasturtium occidentale* and *N. dictyotum* ; *Cheiranthus capitatus* is transferred to *Erysimum* ; *Capnorchis* and *Capnodes* are the generic names taken up respectively for *Diclytra* and *Corydalis*.

N. L. B.

Flora of Cacouna, P. Q—Notes on the. D. P. Penhallow. (Canadian Rec. Sci. iv. 432).

Flora of Colorado—Additions to. Alice Eastwood. (Zoë, ii. 226).

A list of 113 plants is given, of which *Aquilegia ecalcarata*, *Thelypodium aureum*, *Encelia nutans* and *Chænactis scaposa* are described as new.

Flora of the Olympics. L. F. Henderson. (Zoë, ii. 253).

Report of the Botanist of the O'Neil Expedition, from observations taken during six weeks stay with the party, and incidents of general interest. An interesting account of the flora of the region, as well as a list of the five hundred species collected.

Forest Trees of Indiana. Stanley Coulter. (Proc. Am. Ass. Ad. Sci. xxxix. 330).

Fresh Water Algæ of Maine. William West. (Journ. Bot. xxix. 353.)

The new species described are: *Sphærozosma punctulatum*, *Closterium subangustatum*, and *Penium annulare*.

Geographical Distribution of North American Cornaceæ. John M. Coulter. (Proc. Am. Ass. Ad. Sci. xxxix. 349).

Geographical Distribution of North American Plants—The General. N. L. Britton. (Proc. Am. Ass. Ad. Sci. xxxix. 322).

Geographical Distribution of the Grasses of North America. W. J. Beal. (Proc. Am. Ass. Ad. Sci. xxxix. 312).

Geographical Distribution of North American Umbelliferæ. John M. Coulter. (Proc. Am. Ass. Ad. Sc. xxxix. 292).

Isoetes—Contributions to the Life History of. Douglas H. Campbell. (Proc. Am. Ass. Ad. Sc. xxxix. 333).

Isopyrum biternatum—Notes upon. C. W. Hargitt. (Proc. Am. Ass. Ad. Sci. xxxix. 347).

Lazrea Mexicana—The Leaves and Stipules of. John W. Wilson. (Trans. Bot. Soc. Edin. xix. 185.)

Lepismium dissimile, n. sp. G. A. Lindberg. (Gartenflora, xxxix. 148-153, figs. 37, 38).

List of California Marine Algæ, with Notes. C. L. Anderson. (Zoë, ii. 217).

List of the Indigenous Ferns of the Vicinity of Rochester, with Notes. C. W. Seelye. (Proc. Rochester Acad. Sc. i. 186. reprint).

Lobelia laxiflora, H.B.K. var. angustifolia, DC. *Apuntes para el estudio de la accion fisiologica y terapeutica de la.* José Remirez (El Estudio, iv. 8).

Mariposa County as a Botanical District. J. W. Congdon. (Zoë, ii. 234).

Mariposa Lilies of Colorado—The. Alice Eastwood. (Zoë, ii 201).

Mosses from the Pribylov Islands, Behring Sea, collected by James M. Macoun. (Ottawa Naturalist, 179, 1892).

Six new species and varieties are described by N. C. Kindberg in the following genera: *Ceratodon, Didymodon, Webera, Bryum and Polytrichum.*

Musci Exotici Novi vel minus cogniti. F. Renauld et J. Cardot. (Bull. Soc. Roy. Bot. Belg. xxix. 161–186, 1–90, to be continued).

This is the first of a series of contributions to the moss flora of Madagascar, Reunion, Haiti and Costa Rica. From the last named are described one species in each of the following genera: *Hyophila, Bartramia, Philonotis, Brachyhymenium, Pilotrichella, Neckera, Porotrichum, Raphidostegium* and *Trichostelium.* Illustrations of all the new species are promised.

New Species and Notes of Utah Plants. Marcus E. Jones. (Zoë, ii. 336).

The proposed new species are *Cleomella Palmerana, Astragalus Coltoni, A. asclepiadoides, A. sabulosus, A. argillosus, A Sileranus, A. desperatus, Peucedanum lapidosum, Cymopterus decipiens, Bigelovia gloreosa, Aster venustus, Verbesina scaposa, Bahia desertorum, Gilia Howardi, Hesperanthes albomarginata.* Several new varieties are described as well as several species reduced.

Notes on a Monograph of the Genus Lechea. N. L. Britton. (Proc. Am. Ass. Adv. Sci. xxxix. 331).

Notes on Plants Collected by Dr. Edward Palmer at La Paz, Lower California, in 1890. F. N. Rose. (Proc. Am. Ass. Ad. Sci. xxxix. 347).

Notes upon the Crystals in Certain Species of the Arum Family. Wm. R. Lazenby. (Proc. Am. Ass. Ad. Sci. xxxix. 332).

Observation on the Method of Growth of the Prothallia of the Filicineæ with Reference to their Relationships. Douglas H. Campbell. (Proc. Am. Ass. Ad. Sci. xxxix. 333).

Phacelia—A new. T. S. Brandegee. (Zoë, ii. 252). *Phacelia* (*Euphacelia*) *Eisenii* from Fresno Co., California.

Philadelphus microphyllus. H. Zabel. (Gartenflora, xxxix. 39–41, fig. 10).

Philosophy of the Crossing of Plants considered in reference to their Improvement under Cultivation. L. H. Bailey. Lecture at the public meeting of the Massachusetts State Board of Agriculture, 1892. (Reprint).

Pilcomayo Expedition, Preliminary Notice. J. Graham Kerr. (Trans. Bot. Soc. Edinburg, xix. 128).

Pinus monticola on the Californian Sierras. (Gard. and For. v. 5 and 7. Two illustrations).

Posadæa, nouveau Genre de la Famille des Cucurbitacees. Alfred Cogniaux. (Bull. Acad. Roy. Belg. (III). xx. 475-478). Description of a new genus and species from Colombia.

Potato Scab, a Bacterial Disease. H. L. Bolley. (Proc. Am. Ass. Ad. Sc. xxxix. 334).

Preliminary Notes on a New and Destructive Oat Disease. B. T. Galloway. (Proc. Am. Ass. Ad. Sci. xxxix. 333).

Preliminary note on the genus Rynchospora in North America. N. L. Britton. (Proc. Am. Ass. Ad. Sci. xxxix. 331).

Red Snowberry or Indian Currant. (Meehan's Month. i. 83, illustrated).

Report on the Use of Maize (Indian Corn) in Europe, and the Possibilities of its Extension. (Pamph. pp. 36, U. S. Dept. Agric. Wash., D. C., 1891).

In addition to the economic statistics this pamphlet contains much of general interest in regard to our national grain and its gradual acceptance as a food product in Europe.

Revue Critique des Espèces du Genre Acer. Alfred Waesmael.

(Bull. Soc. Bot. Belg. xxix. 17-65).

This is an annotated list of all the species of *Acer* recognized by the author. He differs materially from the last published monograph of the genus—that of Herr. Pax in Engler's Bot. Jahr. 1885–1886, with supplemental notes in the same journal in 1889—recognizing considerably fewer species. but an enormous number of sub-species, varieties and sub-varieties, many of them purely garden sports. As regards our North American species, both he and Herr. Pax, from paucity of material and unfamiliarity with the trees themselves and their geographical distribution, have clearly fallen into many errors, and we cannot see that the paper here noticed is of any value to American botany.

Relation of the Mexican Flora to that of the United States. Sereno Watson. (Proc. Am. Ass. Ad. Sc. xxxix. 291).

Rusbya, a new genus of the Vacciniaceæ from Bolivia. N. L. Britton. (Proc. Am. Ass. Nat. Sci. xxxix. 332).

Saccorhiza dermatodea—Concerning the Life-history of. W. A. Setchell. (Proc. Am. Acad. Arts and Sci. xxvi. 177-217, 1891, reprinted).

An interesting contribution from Prof. Farlow's laboratory, describing the histology and morphology of a circumpolar alga, with its bibliography and history; illustrated by two finely lithographed plates.

Spiræa discolor, var. *ariæfolia.* J. G. Jack. (Gard. and For. iv. 615, 616; fig. 98).

Thelephorei—Notes on. M. C. Cooke. (Grevillea, xx. 33-35).

New Brazillian species are described in the genera *Beccariella* and *Hypolyssus.*

Uncinula spiralis—Observations on the life-history of. B. T. Galloway. (Proc. Am. Ass. Ad. Sci. xxxix. 333).

Uromyces trifolia—The trimorphism of. J. K. Howell. (Proc. Am. Ass. Ad. Sci. xxxix. 330).

Weeds—The migration of. Byron D. Halsted. Proc. Am. Ass. Ad. Sci. xxxix. 304).

Work of the Botanical Division of the Department of Agriculture. F. V. Coville. (Proc. Am. Ass. Ad. Sci. xxxix. 348).

Proceedings of the Club.

MEETING OF JAN. 27TH, 1892.

Vice-President Dr. T. F. Allen in the chair and forty-three persons present.

The Committee appointed to prepare resolutions relative to the death of Dr. F. W. Anderson, reported as follows:

The death in December last, of Dr. F. W. Anderson, a member of this Club, and a botanist of no mean repute, makes it proper that we should take notice of his labors and the loss sustained by our science in his departure. His early life was spent in Montana, where he engaged zealously in making botanical collections, and where he gave special attention to the study of Fungi, Algæ and Mosses in company with Dr. F. D. Kelsey and Mr. R. S. Williams. In these branches of botany he acquired a large knowledge and made extensive collections. He afterwards held a position in the United States Department of Agriculture at Washington, and contributed several valuable articles to botanical magazines upon the subjects to which he had devoted particular attention. For a year he assisted Mr. J. B. Ellis on his plates of Eastern American Pyrenomycetes, and acquired much skill in the drawing of these difficult objects. Subsequently he volunteered to prepare the drawings to illustrate Mrs. N. L. Britton's projected Handbook of the Mosses of the Eastern United States, and was engaged upon them at the time of his death. To this work he devoted all his powers, and his work was so skillful that his place can hardly be filled. At the time of his death he was an Assistant Editior of the *American Agriculturist*, and was highly esteemed by the proprietors and managers of that journal. His botanical collections have been presented by his father, Rev. Jos. Anderson, and his associate, Rev. F. D. Kelsey, to the Herbarium of Columbia College. In view of his death we recommend the passage of the following resolutions:

Resolved (1), That we put on record our high sense of the value of Dr. Anderson's contributions to botanical science.

(2), That we especially regret the loss which we have sustained in a department of botany not easily filled, a nice discrimination in the interpretation and delineation of cryptogamic plants.

(3), That his amiable character, his cheerful disposition and kindly spirit have added to our loss of a worthy scientist, the loss of a most estimable man.

(4), That this preamble and the accompanying resolutions be spread upon our minutes and that a copy of them be transmitted to the family of our late associate.

(Signed)

THOMAS MORONG,
ELIZABETH G. BRITTON."

The report was unanimously adopted.

Dr. Britton exhibited a specimen of *Galium sylvestre*, Poll., collected by Mr. C. G. Pringle at Charlotte, Vermont, in 1880. He read extracts from a letter just received from Mr. Pringle, to whom he had applied for information concerning the plant, to the effect that it appeared in grass-fields and in 1887, the last opportunity which Mr. Pringle had to observe it, was as abundant as at first. Dr. Britton had not been able to find any reference in print to the presence of this European species in America.

The announced paper of the evening was read by Miss Grace E. Cooley of Wellesley College; entitled "A Botanist's Impressions of Alaska." The paper was profusely illustrated by lantern views, photographs and herbarium specimens. At the close a vote of thanks was unanimously tendered Miss Cooley for her interesting address.

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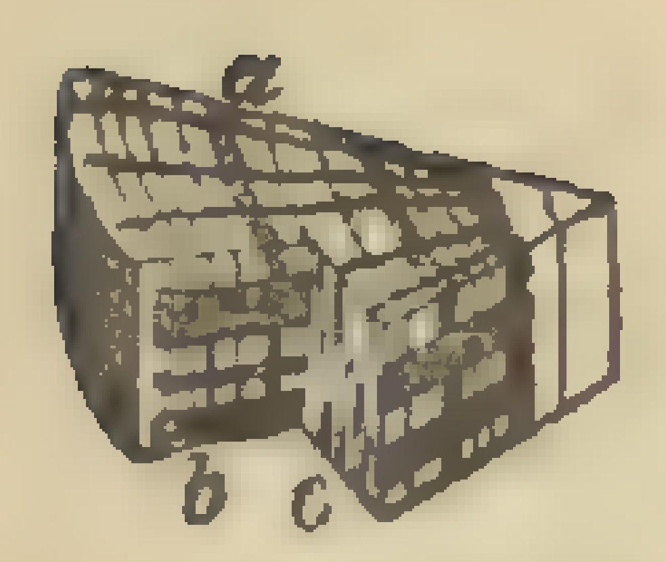

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VOL. XIX. MARCH, 1892. No. 3.

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OF THE
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A MONTHLY JOURNAL OF BOTANY.

EDITED BY

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.
Abnormal Growth of *Spirogyra* Cells: *Emily L. Gregory* (Plate CXXV)........ 75
On the Names of two Species of *Rhus*: *Geo. B. Sudworth*........................ 79
Notes on Peronosporaceæ: *Thos. A. Williams*........................ 81
Parasitic Fungi as Related to Variegated Plants: *Byron D. Halsted*.............. 84
Notes on the Flora of Southwestern Connecticut: *L. N. Johnson*.................. 88
New California Plants: *S. B. Parish*..... 91
Varieties of *Ranunculus abortivus*: *F. L. Harvey*........................ 93
Additions to the Flora of Nebraska: *G. D. Sweezey*........................ 94
The Validity of the Oldest Specific Name: *T. D. A. Cockerell*........................ 95
BOTANICAL NOTES.—A Singular *Rudbeckia hirta*: *John K. Small*; *Phlox maculata* in Waterford, Conn.: *Chas. B. Graves*; Note on the Genus *Henrya*: *W. Botting Hemsley*........................ 95
RECENT LITERATURE RELATING TO AMERICAN BOTANY.—Canadian Hepaticæ; *Copernicia cerifera*; The Dew Berries; Flora of Western North Carolina and Contiguous Territory; Key to the Genus *Fontinalis*; Grasses of the Southwest; Hepaticæ Americanæ; An Arrangement of the Genera of Hepaticæ; New Mosses from the Pribylov Islands: Notes on the Cone-bearers of Northwest America; Trees of Salem, Mass.; Patterson's Check-List of North American Plants; Plant-bearing Deposits of the American Trias; Principles and Methods of Geologic Correlation by Means of Fossil Plants; Silva of North America, Vol. III.; Some new Lobeliaceæ in the Vienna Herbaria; What is a Diatom? and briefer notices........ 97
PROCEEDINGS OF THE CLUB................ 105

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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XIX.] New York, March 5, 1892. [No. 3.

Abnormal Growth of Spirogyra Cells.

By Emily L. Gregory.

(Plate CXXV.)

Some *Spirogyra* filaments were obtained for class work from the greenhouse of the Biological Department of the University of Pennsylvania, about the last of January, 1891. These were soon noticed to present an appearance of branching quite unlike that occurring in the ordinary process of reproduction. The regular routine of class work prevented any continued study of the processes of development, which soon showed themselves to be caused by the attacks of some low organisms, probably the monads described by Zopf. The only definite results obtained from such desultory study as could be given them at odd times have reference to the peculiar manner of growth caused by the irritating organism.

In many cases the malformation caused by parasites preying on Algæ is of a similar nature to that occurring in higher plants. In other words, the abnormal growth seems to be governed by the necessities of the irritating organism and adapts itself in a greater or less degree to the needs of the latter. Familiar examples of this are the so-called *Vaucheria* galls, whose morphological significance is still a matter of doubt. Whether the gall arises from the metamorphosis of a fruit branch, as some claim, or whether an entirely abnormal growth from the side or end of the *Vaucheria* cell, it usually attains a size and shape to accommodate the little rotifer and its eggs. So also in the case of the galls of certain species of *Oscillaria*, caused by the entrance of the zoospores of

Chytridiæ. The growth here does not much exceed that required for the development of the new organisms, and the shape assumed is one entirely suited to the needs of the parasite.

It was the difference in this respect which first excited curiosity in the case of the *Spirogyra* cells in question. The organisms causing the hypertrophy were not easily noticed, while the manner of growth suggested the normal development of root-like organs.

The first appearance of disease was that of separation between the cells of a filament. Then the chlorophyll bands began to lose their hold on the wall, shrinking away from it, at the same time losing their closeness of coil until they become nearly parallel with the long axis of the cell. Although no measurements were taken, this probably came from the growth of the cell without the chlorophyll contents keeping pace with it. The whole process lasted several weeks, and during all this time no traces of foreign organisms entering the cells of the *Spirogyra* were found. This is, however, easily accounted for by the irregularity of the observations and the lack of any high powers of magnification. The later development was such as to suggest the probable presence of certain monad forms which are known to prey upon different species of *Spirogyra*, causing more or less disorganization and disease.

If this were true, there were two very marked peculiarities in their development and results, differing from any account I have been able to find in relation to the development history of these little organisms. These are the singular distortion of the *Spirogyra* cells, before referred to, and the peculiar conduct of the monads after escaping from the cells.

The first appearance of distortion was a lengthening of the wall on one side of the cell so as to produce almost a spiral coil. This seldom occurred in a long filament, but generally in one of one, two or three cells. From this bent or curved side of the cell was sent out a tube or branch, nearly at right angles with the long axis. This branch grew out more or less winding, tapering conically and often ended in a slight extension of a spherical shape. Very often this tube branched dichotomously, the branches then curling and twisting so they resembled small root-like appendages, so common to many Algæ forms. Several short filaments were found, consisting of only three or four cells, coiled several times, and from each coil a tube projecting, afterward branching and the branches coiling and twisting toward the ends. The chlorophyll bands extended into these tubes, but with a feeble, unhealthy look and a loose coil which intimated rapid disintegration. Another perhaps equally common method of branching was from each end of the cell, or from the free ends of two cells still holding fast together. Here the appearance was still more root-like. The extending tube was never more than half the diameter of the cell and very often, forking several times it formed a little snarl of branches. This growing from the end of the cell sometimes happened before the cells of the filament separated, so that from the end of one cell projected a tube into the next, running perhaps half its length.

Cells in this condition in other ways never appeared perfectly healthy. Frequently the spirals were intact and the nucleus still in position, but generally the chlorophyll coils had straightened out, broken in places and appeared contracting into spherical bodies. This breaking up of the chlorophyll bands, according to the general method of development of the monads, we would suppose corresponds with the so-called amœboid stage of the parasite when it gorges itself with the chlorophyll of the cell. Singularly enough nothing whatever could be detected of the monad itself during the formation of unnumbered green spherical bodies, filling the cells more or less closely. The only apparent cause of the formation of these bodies was the collection of the chlorophyll masses about the pyrenoids and the gradual separation of these from each other. This is the more strange as the spores of the ordinary monad forms which attack the Algæ are not so small as to render them difficult of detection with the lens used, which was a number seven, of Leitz. Whatever the explanation may be, these bodies were formed inside the cells in immense numbers. In nearly all cases they retained their chlorophyll till after escaping from the cell, generally also in a bright, healthy condition; seldomer was it found to have turned a dull brownish color like the remains of chlorophyll described by Zopf as having been ejected by the monad.

These bodies generally escaped from the cell at night and hat through some break in the cell wall having no relation whatever to the peculiar branches described before. In only one case did I notice any connection between these tubes and the occupation and departure of the monads. That is to say, the extraneous branches often contained a few smaller spherical bodies, but they seemed to originate and remain mostly in the original cells of the filament. Only in one case was their escape seen and this happened at about 11 A. M. A cell from which just the beginning of a tube projected, contained about four or five of these bodies, together with some slight remains of chlorophyll bands. Two of these worked their way slowly up to the projecting tube and passed into it and then out of the cell. The opening in the wall was apparently caused by the action of some secretion from the green monad as it disintegrated almost momentarily while I was watching it. The debris remained some time after both had escaped. The monads assumed the pear shape common to all such bodies when escaping through an orifice. Shortly after they were free they assumed a spherical form and were soon lost among the countless numbers of similar bodies. This was the only instance in which the escape was noted, because, as stated before, the exodus appeared to take place in the night. Every morning hordes of these green monads were found floating about among the broken cells. For several days after their exit from the cells they remained in about the same condition as at first. Then a change appeared ; on examining the material in the morning certain ones had become very much enlarged, measuring at least twice as much in diameter as the others. These larger ones then went through a series of amœboid motions lasting several hours, but terminating in no special change which was lasting. As this seemed a regular habit of the enlarged ones several were watched closely through all the changing forms, and sketches made. The gyrations of one were followed through a period of about three hours and about forty sketches made. Others were noticed and a striking uniformity of change in shape appeared. To show this more clearly I requested one of my students to watch and sketch the evolutions of one, and the sketches were almost identical with my own. This peculiar series of motions never resulted in actual division, though appearing often as though this was the end in view. The whole returned again to a spherical form and remained passive as before. Other cases were noticed where actual division took place, but this was never connected with the amœboid movement.

As the days passed, other changes occurred; a considerable number, after discharging the green parts of their contents, threw out cilia and remained as long as watched in this amœba condition. Some of these were watched closely during change of form and color, particularly one, which corresponds very closely to one figured by Zopf, as one stage of the monad *Pseudospora parasitica*, Cienk., which is well known for its fondness for *Spirogyra* cells. There were at least three distinct species of amœba found among the remains of these bodies, but their origin in all cases could not be determined.

The singularity connected with these organisms is the lack of proof that they were the developed form of certain monad spores which had bored their way into the cell, together with the fact that if they did have such an origin, they did not develop into the amœba stage inside the cell, but simply gorged themselves with food and then issued forth in swarms to pass through other stages outside. This, with the peculiar hypertrophy exhibited, which in only one case seemed to be of any use to the parasite, are the two features considered worthy of mention.

DESCRIPTION OF PLATE CXXV.

1.—*Spirogyra* cell showing beginning of tube formation at *a*. Contents of growing portion colorless but granulated.

2, 3 and 4.—Cells showing different stages of this development. The inner lines show remains of chlorophyll bands.

5.—A cell showing the second method, viz., the growth of tube into the adjacent cell. This seen at *a*. *c*. Cell nucleus. *d*. Another tube growing outward.

6.—Cell with only a slight projection, but from which the green bodies *a* are about to escape.

7.—Green body after having escaped.

8 and 9.—Amœba forms originating from such bodies as 7.

On the Names of two Species of Rhus.

Rhus cotinoides, Nutt.—Regarding the synonymy of this plant, perhaps a few words may be said in addition to the revision already published by Prof. Sargent in Garden and Forest, iv. 340. As there shown, the earliest name for this plant is that of Nuttall, *Cotinus Americanus* (1842–'50), and according to Engler's division, the combination remains unchanged; but if *Cotinus* is made a section of *Rhus*, *Cotinus Americanus*, Nutt. becomes *R. Americanus* (Nutt). (=*R. cotinoides*, Nutt. MSS. in Herb).

The name *Rhus cotinoides*, by which this plant has long been designated, is commonly attributed to Nuttall; the latter, however, first applied it only as an herbarium name. It is said, moreover, to have been first published in 1860 (Chapman's Fl. Southern States); but the name doubtless belongs to Cooper, who published it in 1859 (Rep. Smithsonian Institution for 1858, 250), citing as a synonym, *Cotinus Americanus*, Nutt., which is equivalent to a formal publication.

Rhus typhina, L. (1760).—Dr. Britton has discussed (Bull. Torr. Bot. Club, xvii. 269) the synonymy of this plant, and points out that the first name, *Datisca hirta*, L. (Species Plantarum, 1037, 1753), which is commonly cited as a synonym of this plant, is debarred as the original name for the Staghorn Sumach, because of Engler's publication (DC. Monog. Phan. iv. 425, 1883) of the combination *Rhus hirta*, Harv. (Mss. in Herb. Kew) as a synonym of *Rhus tridentata*, Sond. Dr. Britton's decision would seem to be in strict accordance with the principle to be observed, "Once a synonym always a synonym."

But in following this principle to the letter, perhaps the fundamental meaning is overlooked. It is true that 1883 marks the first appearance of the binominal *Rhus hirta* (Harv. Mss. in Herb. Kew), Engler, and would thus appear to preclude the use of this name for our Staghorn Sumach. But before holding fast to this position, we must, it seems to me, inquire whether the specific term *hirta*—unquestionably first applied to our plant—can be lawfully appropriated in any other combination than in one for our species. This term is doubtless the permanent member of the binomial to designate our Sumach, and in whatever genus the species is finally placed, its original specific name *hirta*—if not antedated by an earlier application to another species—must belong where first applied. *Hirta*, therefore, never was a synonym, nor can it ever become one; and in forming from *Datisca hirta*, L., the combination *Rhus hirta*, Harv. l. c. for an African species of *Rhus* (*R. tridentata*, Sond.), an invasion was made on a name unconditionally preoccupied. *Rhus hirta* (L.), to be legitimately written only for our Sumach, has never been proposed, and is not a synonym in fact—*Rhus hirta* (Harv. Mss. in Herb. Kew), Engler, l. c. is.

Moreover, in maintaining *Rhus hirta* (L.) for the Staghorn Sumach, we follow the ornithologists' interpretation of "Once a synonym always a synonym."

I should, therefore, propose that *Rhus typhina*, L. (1760) be replaced by *Rhus hirta* (L.) (=*Datisca hirta*, L., 1753), not *Rhus hirta* (Harv. Mss. in Herb. Kew), Engler (1883).

GEO. B. SUDWORTH.

Forestry Division, Department of Agriculture, Washington, D. C.

[Mr. Sudworth's notes touch on the question of what importance is to be placed on the publication of a name as a synonym. His first-mentioned species appears to have been first alluded to in print by Torrey and Gray (Fl. N. A. i. 217, 1838), where it was doubtfully referred to the European *R. Cotinus*, L., and "*R. cotinoides*, Nutt. in herb. acad. Phila.," printed as a synonym. The appearance of this name dates then from 1838, and we fail to see any reason why it should not be maintained. It is quite equivalent to an author publishing two names for a plant, the first of which is preoccupied. His second case is similar, but not identical. *Rhus tridentata*, Sond., should in my view not stand, on account of the earlier publication of *Rhus tridentata*, Thunb., which would bring in *R. hirta*, Harv., for *R. tridentata*, Sond. —N. L. B.]

Notes on Peronosporaceæ.

The following list of Peronosporaceæ includes species found in the vicinity of Brookings, S. D., during the summer of 1891. The region covered is that included within a radius of five miles from the city. Specimens of all the species have been collected upon the college farm, also, which lies close to the city and is situated upon prairie uplands.

PERONOSPORA ARTHURI, Farlow.

This species was very plentiful during July on *Œnothera biennis*. Plants growing in the wild flower garden suffered most. Many plants were entirely stripped of their leaves.

Septoria Œnotheræ often occurred in company with the mildew and together they did much damage. *Œnothera Missouriensis* growing in the garden was somewhat affected by the mildew.

PERONOSPORA CYPARISSIÆ, DeBary.

The mildew of our spurges seems to belong to this species rather than to *P. Euphorbiæ.* All my specimens agree with DeBary's description. The fungus grew plentifully on *Euphorbia glyptosperma* and *E. maculata.* It appears on the under side of the leaves, petioles and branches, and is most plentiful on the central branches, causing them to assume an upright mode of growth. It has aided very materially in checking the growth of these weeds.

PERONOSPORA EFFUSA (Grev.), Rabenh.

Very plentiful on spinach (*Spinacea oleracea*) and goosefoot (*Chenopodium album* and *C. hybridum*). It has been very destructive to all hosts and especially so to spinach. All of these plants grown in the college gardens were so badly affected as to be hardly fit for any use at all, and were destroyed long before the season was over. It was often associated with a "leaf-spot" fungus (*Stegonospora Spinaceæ*, E. & E. n. sp. in litt,) which bids fair to become a serious pest.

PERONOSPORA LEPTOSPERMA, DeBary.

Common on *Artemisia biennis* during June and early July. It was usually destructive to the affected leaves, but did little injury to the plant as a whole.

PERONOSPORA PARASITICA (Pers.), DeB.

This species has done good service in killing off many of the crucifers of weedy habits. It has been very plentiful. The plants found in this vicinity affected by it are: *Brassica nigra, B. alba, B. Sinapistrum, Sisymbrium canescens, Lepidium intermedium, L. Virginicum, L. sativum, Capsella Bursa-pastoris, Nasturtium hispidum, N. Armoracia* and *Raphanus sativus.* The damage done to the two last hosts was slight, however, so the mildew has been decidely beneficial.

PERONOSPORA VIOLÆ, DeB.

Quite plentiful on pansies (*Viola tricolor*) in flower gardens during the latter part of August and early part of September. Very injurious.

SCLEROSPORA GRAMINICOLA (Sacc.) Schroet.

This fungus has been plentiful on *Setaria viridis*, often in company with *Pericularia grisea* (Cke.), Sacc. It did much damage to that weed and thus did good work for the farmers.

PLASMOPARA HALSTEDII (Farl.), Ber. & DeT.

Probably the most destructive mildew in this locality. It was collected in abundance on *Helianthus tuberosus* and *Iva xanthiifolia*. On the former host it was often found completely covering the under side of every leaf of the plant, which it usually killed. It was most plentiful on this host during a rather wet spell of weather in early July. On *Iva* it seldom covered the entire plant, but was abundant enough on the lower leaves to cause them to fall off and do serious injury to the plant. This species of *Iva* is very plentiful around Brookings, yet I was unable to find a single unaffected patch of it during July and early August.

PLASMOPARA PYGMÆA (Ung.), Schroet.

Early in June a small amount of this species was found on an undetermined species of *Anemone*, but was not found again. Though occurring in but a limited area it was quite injurious to the host.

CYSTOPUS BLITI (Biv.), DeBary.

Very plentiful from June to September on *Amarantus albus*, *A. retroflexus* and *A. blitoides*. It injured the leaves considerably, but did not seem to affect the "seed-bearing" of the plant very much. It remains later than any other species that I have observed.

CYSTOPUS CANDIDUS (Pers.), Lev.

During the season this species has been collected on *Brassica nigra*, *B alba*, *Lepidium Virginicum*, *L. intermedium*, *Nasturtium Armoracia*, *N. hispidum*, *Sisymbrium officinale*, *Capsella Bursa-pastoris* and *Lepidium sativum*. It was quite injurious in many cases, especially on horseradish, where, in connection with *Ramularia Armoraciæ*, it did much damage.

CYSTOPUS TRAGOPOGONIS (Pers.), Schroet.

By far the most destructive species in this genus. Entire patches of *Ambrosia artemisiæfolia* and *A. psilostachya* were so badly injured by it as to ripen but little or no seed. Even along the dry, dusty streets of the city this was true. Though the fungus was found in June and early July it did not become so destructive until the dry weather of the latter part of July and August.

A few specimens of a *Cystopus* probably belonging to this species was found on *Artemisia biennis*, usually associated with *Peronospora leptosperma*, DeB. It was not very injurious on this plant however, and never occurred in any quantity.

The rainfall for the summer months of the years 1890 and 1891 was as follows:

1890.	in.	1891.	in.
June	7.91	June	4.09
July	1.54	July	2.01
August	2.07	August	1.38

During the two years preceding 1890 the amount of rainfall was much less, being but 5.53 in. for the whole three months in 1888, and 5.03 in. in 1889. During the past summer there were several heavy rains in June, and they were distributed in such a way as to keep up a tolerably luxuriant vegetation throughout the month. The mildews and white rusts were plentiful at this time, but apparently did but little damage. The greatest amount of injury was done during the dry weather of July and August. The fungi had then a good hold on the host plants, many of which were not able to withstand both dry weather and fungous injuries.

On the whole the observations of the season have shown a greater abundance of these fungi here than one would naturally expect to find in so dry a climate. The number of species, while not large, is surprising, and the abundance of each species is very much more so. Another noticeable feature is the injuriousness of such a great majority of the species found.

Agricultural College, S. D. THOS. A. WILLIAMS.

Parasitic Fungi as Related to Variegated Plants.*

BY BYRON D. HALSTED.

During the past two years a large number of variegated plants have been examined with reference to the presence of parasitic fungi. Attention was first called to the subject by a study of the foliage of a variegated ash, which had its leaves badly spotted with a species of *Coniothyrium*, while ordinary ash trees were free from the same fungus. Some of the variegated plants, both of the hardy sorts and those grown under glass, have been badly infested with leaf blights. Of the former may be named the delicate and popular bedding plant called plantain lily (*Funkia undulata*, var. *variegata*) several sorts of variegated pelargoniums and alternantheras. Among the most affected of the tender plants of the variegated class may be mentioned the *Aspedistra lurida*, var. *variegata*, *Ficus elastica*, var. *variegata*, *Abutilon Thomsoni*, *Codiæum* sp. (crotons), *Dieffenbachia*, sp., *Hydrangea hortensis*, var. *variegata*, *Phrynium variegatum*, *Dracæna*, sp., etc.

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* Abstract of paper before Torrey Botanical Club, February 9th, 1892.

Particular attention was paid to the fungi upon the *Funkia* and *Aspedistra*, as they, at sight, manifested some strong points of resemblance. There was no difficulty in growing the anthracnose from one to the other host in cultures, and as the microscopic structure of the fungus upon both is the same, there seemed to be sufficient reason for giving it the name of *Colletotrichum omnivorum*. It remains to be proved that some of the other hosts attacked by a *Colletotrichum* are bearing the same fungus.

The following is an alphabetical list of the genera containing one or more variegated species that are specially subject to the attack of fungi, with the genera of the latter so far as they have been determined:

Abutilon Thomsoni and *A. megapotamicum*—Colletotrichum, Phyllosticta.

Acalypha musica and others—Phyllosticta.

Acuba Japonica—Colletotrichum.

Ageratum Mexicanum—Phyllosticta.

Alocasia, several species—Colletotrichum, Sac fungus.

Alternanthera paronychoides and others—Phyllosticta.

Aralia pentaphylla, var. *variegata*, *A. Sieboldi*, var. *variegata*—Leptosphæria.

Aspedistra lurida, var. *variegata*—Colletotrichum.

Astilbe Japonica, var. *variegata*—Leptosphæria.

Begonia Rex, and others—Cercospora, Phyllosticta and Colletotrichum.

Centaurea, a variegated form—Septoria.

Cissus discolor—Glœosporium.

Codiæum triumphans, and many others—Phyllosticta, Glœosporium.

Coleus Verschaffeltii, and others—Phyllosticta.

Cyclamen Persicum, and others—Phyllosticta.

Cypripedium, several variegated species—Colletotrichum, Phyllosticta.

Dieffenbachia, several species—Glœosporium, Colletotrichum.

Dracæna Goldieana, D. Lindeni and others—Colletotrichum, Glœosporium, Lœstadia, Phyllosticta.

Elæagnus glabra, var. *variegata*—Colletotrichum, Sac fungus.

Eranthemum sp.—Phyllosticta.

Evonymus Japonicus, var. *variegatus*—Coryneum.

Ficus Parcelli, F. elastica, var. *variegata*—Glœosporium.

Fraxinus, a variegated form—Coniothyrium.

Funkia undulata, var. *variegata*—Colletotrichum, Phyllosticta.

Hedera Helix, var. *variegata*—Phyllosticta, Colletotrichum.

Hibiscus Syriacus, var. *variegatus*—Phyllosticta.

Hydrangea hortensis, var. *variegata*--Phyllosticta.

Impatiens Sultani, var. *variegata*—Phyllosticta.

Ipomœa Bona-nox—Phyllosticta.

Iresina Herbstii—Colletotrichum, Sac fungus.

Livistonia, a variegated form—Colletotrichum, Glœosporium.

Maranta bicolor, and others—Læstadia, Colletotrichum.

Nepeta Glechoma, var. *variegata*—Phyllosticta, Glœosporium.

Nerium Oleander, var. *variegatum*—Glœosporium.

Ophiopogon Jaburan, var. *variegatus*—Colletotrichum.

Pandanus Veitchii, and others—Glœosporium.

Passiflora, a variegated form—Phyllosticta.

Pelargonium, several variegated varieties—Ascochyta, Colletotrichum.

Phrymium variegatum—Colletotrichum, Glœosporium.

Pittosporum viridiflorum, var. *variegatum*—Phyllosticta.

Ptychosperma, a variegated form—Colletotrichum.

Reinechia variegata—Glœosporium (?).

Rhodea Japonica—Glœosporium (?).

Richardia albo-maculata—Phyllosticta.

Sambucus nigra, var. *variegata*—Phyllosticta.

Sarracenia Drummondii—Colletotrichum, Sac fungus.
Solanum jasminoides, var. *variegatum*—Septoria.
Spiræa, a variegated form—Diplodia.
Stevia, a variegated form—Phyllosticta.
Vinca major, var. *elegantissima*—Phyllosticta, Septoria.

In the above list of fifty genera, which includes more than a hundred species of variegated plants that have been examined, it will be seen that there are three genera of fungi that lead all others. Phyllosticta is met with twenty-four (24) times, Colletotrichum nineteen (19), and Glœosporium twelve (12) times. It is not the purpose here to enter into the causes of etiolation or variegation, or to draw any well defined conclusions from the facts. The ordinary green form of the species has been studied in many instances, as for example in the ash mentioned at the outset, in the *Abutilon*, *Ageratum*, *Ficus*, *Impatiens*, *Nepeta*, *Passiflora*, *Pelargonium*, and others, with the result that they are much less frequently attacked than the variegated sorts. Furthermore, in some plants the etiolated part occupies large portions of the leaf, and as a rule the portions without the chlorophyll are the most susceptible. In the *Aspidistra*, for example, the one half of the long leaf may be green and the other white, in which case the latter is with few exceptions the only one attacked. In the *Hydrangea* the middle of the leaf is etiolated, and here the blight first begins its destructive work. The case is somewhat similar in phrynium. In *Passiflora*, *Pelargonium*, *Sambucus*, *Ageratum*, *Hibiscus*, *Dracæna* and several others, the white is distributed in blotches near to the margin of the leaf, in all of which cases the decay due to the fungus produces a ragged edge. When the variegation is quite evenly distributed over the leaf in like manner, the parasite is widely scattered, and the whole leaf decays, as in the *Dieffenbachia* and *Abutilon*. There seems to be no question that the variegated leaves are more susceptible, and that likewise the etiolated parts are the ones first attacked. The absence of green in a leaf, from this it is to be inferred, is a source of weakness, and upon this account the etiolated tissue is less able to resist the attacks of the fungus germs.

Speaking generally, a variegated plant lacks capacity for the best work, and the gardener, in propagating a variegation, no matter how it may have originated, is propagating a weakened plant in so far as it has its normal amount of chlorophyll reduced. The fact that some sorts of the self-blanched celery have been found more susceptible to blights and decay bears directly upon this point. It is a pity that so many of our choicest variegated plants blight easily; it is, however, natural that they should do so. Even a fungus parasite will take the line of least resistance.

Notes on the Flora of Southwestern Connecticut.

By L. N. Johnson.

Every season during the past ten years it has been the good fortune of the writer to spend some weeks collecting in southwestern Connecticut. As some of the finds were of interest these notes have been prepared for the purpose of placing them on record.

The face of the country is diversified, consisting of nearly parallel ridges running north and south, with their slopes about equally covered with woods of oak, chestnut, hickory and maple, and with cultivated ground. Every valley carries a stream, and following these a few miles to the south we come to the plain, which, varying in width, borders Long Island Sound, and furnishes the peculiar vegetation of the salt meadows and marshes. Most of the collecting here described was done in the valley of Mill River, and in the shore region around Bridgeport.

The ridge which runs north from Bridgeport finds its highest point in Tashua Hill, about six miles back from the shore. In the woods on its western slope, and in the adjacent valley, is an admirable collecting ground. Here we find *Cypripedium acaule* growing abundantly, and with it *Pogonia verticillata*, *Liparis liliifolia*, and a number of other orchids, including rarely *Cypripedium parviflorum.* Here too grows *Aristolochia Serpentaria.* It was formerly common, but is now nearly exterminated. The writer procured specimens from a neighbor, but could not induce him to tell the exact locality, as it is still prized as a medicine, and the secret carefully guarded by the lucky finder of its haunts.

In the level meadows along the river grow half a dozen *Habenarias*, most conspicuous of which are *H. psycodes*, with spikes sometimes a foot or more in length, and the more beautiful but very rare *H. fimbriata.* Here too grows *Iris prismatica*, and on a little point projecting into a pond *Hierochloë odorata.* In the lowland woods, among other interesting plants, *Viola rotundifolia* is frequent, and on higher ground *Viola pedata.* In this same valley a few specimens of *Pentstemon lævigatus* have been found, while *P. hirsutus* has not been seen, though it occurs a few miles to the eastward. *Drosera rotundifolia* occurs here, though not abundantly. Its habit is perhaps worth notice. It grows on the surface of a smooth ledge over which a little water is continually oozing, but there is very little soil.

In a swamp on the southwestern slope of Tashua Hill *Sium Carsonii* grows in great abundance, almost choking the brook in some places. It is confined to the bed and immediate banks of the stream. The locality is at present in danger of extermination by the dam of the new reservoir, which is in process of construction.

On the wooded ridge west of Tashua is a locality where *Woodwardia areolata* is abundant (over a small area). With it grow *Aster acuminatus*, *Pyrola elliptica* and *P. rotundifolia*, the two *Chimaphilas* and numerous other plants of interest. Not far distant *Botrychium lanceolatum* has been found, and still farther west is a swamp which is a favorite haunt of *Calla palustris*, and in the same vicinity *Carex umbellata* was found by the roadside, though recent search has failed to reveal any more specimens.

Following down Mill River some four miles, most of the way through rich collecting ground, we come to Samp Mortar Rock, a much-visited and very picturesque locality. Here in the stream one can find *Utricularia vulgaris* and *U. intermedia*, the latter creeping among the stones, and sending its naked bladder-bearing branches down to the water below. In the swift places the stones are covered with mats of *Podostemon ceratophyllus*, which may be seen in fruit in August. In the sand along the edge of the stream is *Callitriche Austini*, while in the river here, as elsewhere, *C. verna* is not uncommon, though not assigned to New England at all in the last edition of the Manual. Back from the river, on the sandy slopes in an old pasture, are several large patches of *Rubus cuneifolius*. Further up in the edge of the woods are *Oxalis violacea*, and *Aralia hispida*, and in the clefts of the over-hanging rocks there is an abundance of *Asplenium Trichomanes*, and *Carex trisperma*. A few rods below, among the bushes, in an old pasture surrounded by woods, a single specimen of *Tradescantia Virginica* was seen. It was probably introduced, though it is hard to see how unless by the birds.

As one nears the shore he finds some species not noted before. In the woods north of Bridgeport an occasional specimen of *Microstylis unifolia* may be found, and along the shores of the ponds *Elatine Americana* occurs in profusion in several places. With it is *Myriophyllum ambiguum*. Of the latter we have found three forms, which seemed well-marked, growing within a few feet of each other. The first, which seems to agree with the var. *capillaceum* of the Manual, grows entirely under water. Where the water has receded, leaving the plants on the mud, the lower capillary leaves are somewhat dried up, while the new leaves at the tip are broader, and pectinate or even linear—like the typical form, in short. On the hard, gravelly bank, where the water can only cover it in the spring, grows a form with short ascending, or almost erect stems, with the leaves all pectinate, serrate or linear—var. *humile* (Raf.) apparently.* This last form bears no superficial resemblance to var. *capillaceum*, but the typical form at once shows the connection.

On a hill above Moody's Pond is a field where a large colony of *Aletris farinosa* grows, and a short distance the other side of the pond is the only locality in which the writer has seen *Cuphea petiolata*. The pond itself during the last summer has furnished several specimens of *Ceratophyllum demersum*, var. *echinatum*, in fruit.

Nearer the shore, but not on the marshes, several things of interest are found, notably *Spiranthes simplex*. This is probably overlooked because of its close superficial resemblance to *S. gracilis*, though on comparing them the differences are apparent. In a large number of specimens examined the root was uniformly a single tuber, while in *S. gracilis* it has always more than one tuber, usually two. With this plant grow *Eupatorium hyssopifolium* and *Chrysopsis falcata*. *Helenium autumnale*, and

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* As shown by Dr. Morong, *humile*, Raf. is the older name for this species.—Ed.

Sagina apetala are not rare along the roadside, the latter usually accompanied by *Tissa rubra*. On the dry knolls *Liatris scariosa* is rather common. Here and there are clumps of *Triodia seslerioides*, but usually near the shore.

The brackish marshes furnish a long list of plants, only a few of which can be mentioned here. Among them are *Liparis Lœselii*, (rare in only a single swamp, so far as known), and *Utricularia clandestina*, which is common but not often found in flower. It forms mats on the mud in the bogs, or, in one case, on the surface of a shallow fresh pond. Other characteristic inhabitants are *Œnothera fruticosa*, *Poterium Canadense*, and in the salt meadows, *Gerardia maritima*, *Pluchea camphorata* and *Samolus Valerandi*, var. *floribundus*, with here and there *Salicornia mucronata*. On the borders of one marsh a single specimen of *Habenaria ciliaris* was found, and *Cnicus spinosissimus* is an occasional find.

In Stratford *Hibiscus Moscheutos* is abundant, and on the sandy shore of a brackish pond *Sabbatia stellaris*, *Aster tenuifolius* and *A. subulatus* are common.

Tissa marina is a common beach plant, and on the sand at Black Rock grows *Diodia teres*, with *Polygonum articulatum*, *Triplasis purpurea*, *Aristida tuberculosa*, *Salicornia herbacea*, *S. ambigua*, and other characteristic beach plants. *Scirpus pungens* is present in two forms, well-marked by habit, though the writer has been unable to detect any difference in fruit. One is much stouter than the other, and forms much larger spikes, several in a cluster, while the other has one small one and looks quite different.

The list given above might be indefinitely extended, but these are the most important finds. Of those mentioned several are not recorded in the Manual as occurring in New England.

New California Plants.

BY S. B. PARISH.

PSORALEA RIGIDA.—Erect, 1–2 ft. high, viscid above and sparsely villous with short black and white hairs intermingled; leaves pinnately 3-foliate, on inch long petioles; leaflets as long, ovate-lanceolate, glabrous and rigid; stipules lanceolate; peduncles shorter than the leaves, bearing a globose head, inch high, twenty-flowered; bracts shorter than the flowers, lanceolata, deciduous; calyx two-thirds length of the corolla, its teeth acuminate, the lower twice the length of the upper; corolla 8 lines long, whitish or ochroleucous, the keel with a large purple spot at the apex; petals very long-clawed; the tenth stamen free one-third its length; ovary densely villous; pod one-fourth inch long, not wrinkled, closely conformed to the shining dark seed.

Dry hills, Oak Grove, San Diego Co., June, 1882. (Parish 643).

OPUNTIA BERNARDINA, Engelm. in herb.

Loosely branched shrub, 2–4 ft. high, several-stemmed from the base; joints cylindrical, 3-12 inches long, with a slight scurfy pubescence, never deciduous; tubercles of the younger joints oblong and very prominent, shorter and less marked on the older; spines yellow, ¼-1 inch long, one or two usually longer and stouter than the others; flowers in a dense cluster at the ends of the previons year's joints; inner segments of the perianth yellow, outer greenish, or dull red; fruit ovate, less than an inch long, deeply umbilicate, the tubercles bearing a single short spine, becoming at length dry, and only then deciduous, usually fertile, but few-seeded; seed flat, one-fourth inch in diameter, the rhaphe channeled.

Dry hills and mesas from the Coast Range to the San Bernardino Mts., in the San Jacinto and San Bernardino Valleys.

This is the only Cylindropuntia in the region indicated, and apparently does not extend to the coast region or the deserts. Specimens distributed by the National Herbarium, ticketed "New Mexico, Geo. R. Vasey, February, 1881," were probably collected in Southern California, where Mr. Vasey was at that date.

✓*O. basilaris*, E. & B., var RAMOSA. Spreading, and the joints freely branching above; joints and fruit glabrous; otherwise as in the species.

Dry washes and gravelly benches of the Colorado and Mojave deserts, and occasionally in the less arid regions; dry ridges, 7000 ft. alt., on the northern side of the San Bernardino Mts., near Bear Valley; San Mateo Pass; San Jacinto Plains as far as

Box Springs; Temecula; Coast Range at least to the Santa Margarita River.

This variety is the common form of the species in Southern California; only near the summit of the Cajon Pass have I seen plants basilar branched as defined by Engelmann and figured in Pac. R. R. Rept., iv. t., 13 f. 5.

GILIA (DACTYLOPHYLLUM) MACULATA.

Inch high, diffusly branched from the base, sparsely pubescent; leaves entire, two lines long, broadly linear, thick and strongly carinate, obtuse, acerose; earlier flowers nearly sessile in the lower forks, later ones crowded above; calyx-lobes nearly equal, much like the leaves, but with a narrow hyaline margin, ciliate; the narrowly campanulate tube of the corolla not exceeding the calyx, the limb rotate, 2 lines wide; filaments inserted on the base of the tube; anthers exserted; seeds few.

Borders of the Colorado desert, at Agua Caliente, San Diego Co. W. G. Wright.

Near *G. demissa*, Gray, from which it differs in its entire leaves, obtuse and ciliate calyx-lobes, narrower corolla, and exserted anthers.

Varieties of Ranunculus abortivus, L.

In the list of Plants of Arkansas, by John C. Brannar and F. V. Coville, (Ark. Geol. Survey, Vol. iv. p. 155), we find recorded three varieties of *Ranunculus abortivus;* viz., *grandiflorus*, Engelm., *Harveyi*, Gray, and *micranthus* (Nutt.), Gray. Two of these are credited to the writer and the third, though not credited, was also collected by him. It may be interesting to botanists to know that the varieties *grandiflorus*, Engelm., and *Harveyi*, Gray, are the same form, specimens having been sent to Drs. Gray and Engelm. and independently named by them. The first appearance of this form in print, so far as the writer knows, was in "Patterson's Check List," as *R. abortivus*, var. *Harveyi*, Gray. Specimens were sent to both about the same time, but so far as I can remember to Dr. Gray *first*. The writer had some correspondence about this form with Dr. Watson, thinking it must be a distinct species from *R. abortivus*, an opinion he is still inclined to hold from a knowledge of the plant in the field. It grows on ledges of rocks high above valleys, where *R. abortivus, type*, or *R. abortivus micranthus* were never seen. There is fully two weeks difference in the time of flowering. The petals exceed the calyx considerably. The plant is more slender, the branches more spreading and graceful, and the head of achenes smaller. It may be possible that specimens bearing both these names are in the collection left by the writer at the Ark. Ind. Univ. We hardly think this possible and presume the name *R. abortivus*, var. *grandiflorus*, was found in the MSS. of Dr. Engelmann and incorporated in the above list. The var. *grandiflorus* should be dropped. F. L. HARVEY.

ORONO, ME., February 5th, 1892.

Additions to the Flora of Nebraska.

BY G. D. SWEZEY.

The following species not before noted from the State have lately been added to our herbarium:

Mountain and western species extending into the western part of the State:

Clematis Scottii, Porter. Sheridan Co.

Argemone Mexicana, L. var. *albiflora*, DC. Common westward.

Stanleya pinnata (Pursh.) Britton. Sheridan Co.

Psoralea digitata, Nutt. Brown Co.

Lathyrus ornatus, Nutt. Common westward.

Ribes setosum, Lindl. Dawes Co.

Mentzelia nuda, Torr. & Gray. Keith Co., Box Butte Co.

Erigeron macranthus, Nutt. Brown Co.

Actinella scaposa, Nutt. var. *linearis*, Nutt. Franklin Co.

Gilia linearis (Nutt.) Gray. Sheridan Co.

Krynitzkia Californica, Gray. Keith Co.

Calochortus Nuttallii, Torr. & Gray. Sheridan Co.

Eastern and European species extending into the wooded belt along the Missouri River: (These were all collected at Nehawka, Cass Co.)

Caulophyllum thalictroides (L.) Michx.

Lychnis Githago (L.) Lam.

Hypericum Ascyron, L.

Desmodium Illinoense, Gray.
Cratægus mollis (Torr. & Gray) Scheele.
Osmorrhiza Claytoni, (Michx.) B. S. P.
Convolvulus arvensis, L.
Seymeria macrophylla, Nutt.
Anychia Canadensis (L.) B. S. P.
Asprella Hystrix (L.) Willd.

DOANE COLLEGE, CRETE, January 2, 1892.

The Validity of the Oldest Specific Name.

The method adopted by Mr. Sudworth (see Vol. xviii. 289) appears to result from a logical application of the law of priority, and will probably in time find acceptance among botanists, as it is already doing among zoologists. If the identical name for both genus and species is to be avoided, it is the genus that must go—and yet I presume nobody will propose to abolish *Nasturtium*, *Ustilago*, *Opuntia*, etc., for this reason! Some years ago I brought this question forward in a short article dealing with nomenclature (*Science Gossip*, 1888, p. 276), and since then have noted down cases of the kind when I have come across them. The following are additional to those given by Mr. Sudworth :

Present Name.	Linnean Name.	Correct Name by Priority.
Nasturtium officinale, R. Br.	*Sisymbrium nasturtium.*	*Nasturtium nasturtium* (L.).
Guazuma tomentosa, H.B.K.	*Theobroma guazuma.*	*Guazuma guazuma* (L.).
Pimenta officinalis, Lindl.	*Myrtus pimenta.*	*Pimenta pimenta* (L.).
Cinnamomum Zeylanicum, Breyn.	*Laurus cinnamomum.*	*Cinnamomum cinnamomum* (L.).
Persea gratissima, G.	*Laurus persea.*	*Persea persea* (L.).
Lagenaria vulgaris, Sw.	*Cucurbita lagenaria.*	*Lagenaria lagenaria* (L.).
Manihot utilitissima, Pohl.	*Jatropha manihot.*	*Manihot Manihot* (L.).
Ustilago segetum (Bull.).	*Chaos ustilago.*	*Ustilago ustilago* (L.).

Probably many other cases might be found if a diligent search were made. T. D. A. COCKERELL.

Institute of Jamaica, Jamaica, W. I., Nov. 17th, 1891.

Botanical Notes.

A Singular Rudbeckia hirta. Prof. Halsted's note in the October BULLETIN, entitled "A Double-Headed *Rudbeckia*," called my attention to a specimen I collected in a meadow on the Gap Hills, Lancaster Co., Pa., June 14, 1889. On examination, I find the plant to be a very curious freak. It consists of two stems ascending from a short cylindrical root-stalk. From the place where the two stems leave the root-stalk they are flattened in the ratio of about 1:2. In some places the stems are grooved, plainly showing the double stem, while in other places there is nothing to show the fact except the flat stem. One stem is terminated by two heads crowded apart at an angle; the number of rays in this double head is twenty-eight. The other stem is terminated by a group of three heads, two barely separated and the third separated at a slight angle; the number of rays in this group is forty. The arrangement of the leaves is affected much by the abortion—some are alternate, as they should be; others are opposite, and many are irregular. In the case of the irregular leaves, some spring from the stem almost opposite, some beside each other, and still others at various angles to each other, according as the buds were situated on the joined stems. In one instance two buds seem to have sprung from the same spot, and the leaves continue as one for a short distance, and then separate into two. JOHN K. SMALL.

Phlox maculata, L., *in Waterford, Conn.* About four miles from New London, in a meadow beside Jordan Brook, is a small but flourishing station of the above-mentioned plant. So far as observed, it is confined to two patches, the larger of which comprises an area of thirty or thirty-five square yards, the smaller less than half as large, lying thirty or forty rods farther down the brook. The plant grows very thickly in both these patches, and when in bloom fairly illumines the meadow. The interest in this station lies in the question whether the plant is or is not indigenous here. Only a little way from the meadow is a farm-house which has been occupied by the same family for several generations. There is no tradition in this family as to its ever having been introduced, and no one now living remembers a time when it did not grow in its present position. Furthermore, it is not found in any garden in the neighborhood, and, in fact, I have never seen it in cultivation in this vicinity. All these facts point to its being a native. On the other hand must be mentioned its very limited distribution, its occurrence so far north and east of its recorded range, and its nearness to human habitations. If introduced it must have been at some remote time in the past. At any rate it has maintained itself for many years, is still flourishing, and must be looked upon as thoroughly established.

CHARLES B. GRAVES, M.D.

Note on the Genus Henrya. I find that American botanists (Asa Gray, Proc. Amer. Acad. xxi. 406; J. Donnell Smith, Bot. Gaz. xvi. 198, and J. N. Rose in litt.), are all in favor of restoring *Henrya*, Nees (*Acanthaceæ*) and they ought to know best; therefore my *Henrya angustissima*, in Journ. Linn. Soc. xxvi. 111, and Hooker's *Icones*, t. 1971, must have a new name. I propose calling it *Neohenrya angustissima*.

W. BOTTING HEMSLEY.

KEW, Jan. 16, 1892.

Index to Recent Literature Relating to American Botany.

Acalypha Virginica. A Goiran. (Bull. Soc. Bot. Ital. i. 52, 1892). Reported as introduced along the Adige in northern Italy.

Additional Evidence on the Communicability of Peach Yellows aud Peach Rosette. E. F. Smith. (U. S. Depart. Agric., Div. of Veg. Path. Bull. I., profusely illustrated).

Brasilianische Nutzpflantzen. Theo. Peckolt. (Pharm. Rundsch. ix. 219-222, x. 34).

Canadian Hepaticæ, named by W. H. Pearson, of Manchester, collected and distributed by John Macoun, 1891.

This distribution completes the Bryophyta and includes 116 specimens, accompanied by a printed list containing descriptions of two new species, with illustrations. It has been a great deal of work to get out these valuable sets of mosses and hepatics, and much credit is due for its accomplishment in so short a time. We are informed that a few remaining sets of the mosses will be sold at six dollars a hundred. E. G. B.

Carnation Rust—The. (Gard. & For. v. 18).

Note and illustrations of *Uromyces caryophyllinus.*

Copernicia cerifera. Thomas Morong. (Bull. Pharm. Jan. 1892, reprint).

An interesting account of the Paraguayan Palma negra and the many uses it is put to by the natives, its great hardness and durability, and the well-known "Carnaüba wax" that is obtained from its leaves and berries. Dr. Morong also alludes to other species locally known as Palma blanco and Palma colorado.

Dew Berries—The. L. H. Bailey. (Cornell Univ. Agr. Ex. Station Bull. 34, 376).

Rubus Canadensis, *R. hispidus* and *R. trivialis* and their cultivated forms are described and figured.

Echinocereus Leonensis. (Monatschrift für Kakteenkunde, i. 66).

A description of the plant from Monterey, with illustration.

Echinocereus pectinatus, var. *robustus.* L. Wittmack. (Gartenflora, xxxix. 513, 514, t. 1331).

El Chicaldte (*Argemone Mexicana*). (El Estudio, iv. 23).

Epidendrum Godseffianum, Rolfe. (Gard. Chron. xi. 136).

Flora of Fulton County, Ill.—Collecting List for 1892. H. S. Pepoon. (Lewiston, Ill.).

Flora of Western North Carolina and Contiguous Territory. John K. Small and A. A. Heller. (Mem. Torr. Bot. Club iii. 1-39. Issued Feb. 20th, 1892. Price 50 cents).

This is an account of a very successful collecting expedition made last summer. The following plants are described as new: *Thalictrum macrostylum* (*T. Cornuti*, var. *macrostylum*, Shuttlw., in dist. of Rugel's plants), and *Smilax rotundifolia*, var. *crenulata.* The rare *Verbena riparia*, Raf., was found at two stations, and *Asarum Virginicum*, var. *grandiflorum*, Michx., on Wilson's creek. In addition to these the following are apparently here first reported from south of Virginia: *Thalictrum purpurascens*, *Papaver somniferum*, *Arenaria Grœnlandica*, *Viburnum cassinoides*, *Lonicera Japonica*, *Osmorhiza longistylis*, *Ligustrum vulgare*, *Veronica Anagallis*, *Euphorbia marginata* and *Eatonia Dudleyi.*

The account is supplemented by an enumeration of the flowering plants and ferns collected, and by a list of the mosses by Mr. Small.

Fontinalis.—Tableau méthodique et Clef dichotomique du Genre. J. Cardot. (Revue Bryologique xviii. 81-86, 1891, reprinted).

This is a preliminary key to the long promised revision of the genus, and includes thirty-two species, several American ones being divided and only one, *F. mollis*, Mueller, being unknown to the author. E. G. B.

Grasses of the Southwest. Geo. Vasey. (U. S. Depart. Agric. Division of Bot. Bull. No. 12).

Bulletin No. 12 is Part II. of Dr. Vasey's valuable work on the grasses of the desert region of Western Texas, New Mexico, Arizona and Southern California.

The fifty species figured are: *Elionurus tripsacoides*, *Hilaria rigida*, *Paspalum distichum*, *P. lividum*, *P. pubiflorum*, *Phalaris intermedia*, var. *angusta*, *Aristida purpurea*, *Stipa pennata*, *S. Scribneri*, *Oryzopsis membranacea*, *O. fimbriata*, *Muhlenbergia Buckleyana*, *M. Neo-Mexicana*, *M. Schaffneri*, *M. depauperata*, *Lycurus phleoides*, *Sporobolus argutus*, *S. Buckleyii*, *S. interruptus*, *S. tricholepis*, *S. Wrightii*, *Trisetum Hallii*, *T. interruptum*, *Chloris Swartziana*, *Trichloris pluriflora*, *T. verticillata*, *Schedonardus Texanus*, *Pappophorum apertum*, *P. Wrightii*, *Cottea pappophoroides*, *Scleropogon Karwinskianus*, *Munroa squarrosa*, *Triodia acuminata*, *T. albescens*, *T. eragrostoides*, *T. grandiflora*, *T. Nealleyi*, *P. pulchella*, *T. stricta*, *T. Texana*, *T. trinerviglumis*, *Diplachne fascicularis*, *D. imbricata*, *D. Reverchoni*, *D. rigida*, *D. viscida*, *Eragrostis curtipedicellata*, *E. lugens*, *E. oxylepis*, *E. Purshii* and *Elymus Sitanion*.

The plates are very beautiful, the detail work being especially fine. Dr. Vasey will shortly publish another volume, "Grasses of the Pacific Coast."

Hepaticæ Americanæ. Prepared by L. M. Underwood and O. F. Cook, 1891.

We have received decades XI. and XII. of this fine series of exsiccatæ, including species from Mexico collected by Pringle; Florida and Georgia, Underwood; Louisiana, Langlois; Connecticut and New Hampshire, Evans; Washington, Piper; and California, by Miss Ida Teed. The following genera are represented: *Aneura*, *Calypogeia*, *Dumortiera*, *Fimbriaria*, *Fossombronia*, *Frullania*, *Jungermania*, *Kantia*, *Liochlæna*, *Pallavicinia*, *Plagiochila*, *Porella* and *Radula*. E. G. B.

Hepaticæ—An Arrangement of the Genera of. By A. W. Evans. (Trans. of the Conn. Acad. Vol. iii. 1892 reprint).

This pamphlet will prove an excellent guide for the arrangement of a large herbarium, and a valuable index to the synonymy of the genera. It follows strictly the laws of priority and contains an index of names and synonyms, as well as references to the original place of publication. To the valuable library and kind assistance of Prof. D. C. Eaton, the author makes due acknowledgment. E. G. B.

Il Black-rot sulle Viti presso Firenze. U. Martelli. (Nuovo. Gior. Bot. Ital. xxiii. No. 4, reprint).

Observations on *Physalospora Bidwelli*, Sacc. in Italy.

Masdevallia Shuttleworthii. G. Sommer. (Gartenflora, xxxix. 457, t. 1329).

Mosses—Some New Species from the Pribylov Islands, Behring Sea. Collected by Jas. M. Macoun. N. C. Kindberg. (Ottawa Naturalist v. 179, Jan. 1892, reprinted).

Three new species and two new varieties are described: *Ceratodon heterophyllus*, *Didymodon Baden–Powellii*, *Webera canaliculata*, var. *microcarpa*, *Bryum Froudei* and *Polytrichum alpinum*, var. *microdontium*. The reprint has been distributed with two names corrected, but the names as printed will have to stand, even though the author may have wished it otherwise.

Mosses from Behring Sea, collected by Jas. M. Macoun. N. C. Kindberg. (Ottawa Naturalist, v. 195, 1892).

Four new species are described: *Dicranoweisia obliqua*, *Dicranella polaris*, *D. cerviculata* and *Barbula subcuneifolia*.

E. G. B.

New or Little-Known Plants. C. S. Sargent. (Gard. & For. v. 52, illustrated).

A description of *Smilax Pseudo-China* and remarks on its adaptability as a garden plant.

Night-Flowering Cacti. (Gard. xli. 102, illustrated).

Descriptions of *Cereus Lemairi*, *C. grandiflorus*, *C. Macdonaldiæ*, *C. nycticalus*, *C. Napoleonis*, *C. fulgidus*, *C. triangularis*. *C. coccineus* and *C. rostratus*, cultivated at Kew.

Notes on the Cone-Bearers of Northwest America—I. J. G. Lemmon. (Gard. & For. v. 64).

Pinus Californica, Loiseleur, in Nouveau Duhamel (1816 in part, excluding characters of the seeds), *P. tuberculata*, D. Don, in Trans. Linn. Soc. 1837, *P. radiata*, D. Don, same date, and *P. insignis*, Douglas, in London Arboretum, 1844, are, according to the author, the synonymy of the Monterey pine. The editor of Garden and Forest admits the possibility of Loiseleur's plant being the species now commonly known as *Pinus insignis*, but excludes the name on the basis that the description of the seeds is faulty and adopts the next oldest specific name, *P. tuberculata*, Don.

Notes on Pollination. Alice Carter. (Bot. Gaz. xvii. 19).

Notes on Trees on the Grounds of McGill University. Sir William Dawson. (Canadian Rec. Sci. iv. 407).

On the Relation of Certain Fall to Spring Blossoming Plants. Aug. F. Foerste. (Bot. Gaz. xvii. i.)

Our Trees. John Robinson. (Publ. by the Essex Inst., Salem, Mass., 1891).

A collection of popular essays on the trees, both native and cultivated, of Salem and its immediate neighborhood. These articles written for the Salem Gazette and now brought together in book form, show a good deal of originality in collecting and putting together a mass of historical facts of local interest.

Patterson's Numbered Check-List of North American Plants, North of Mexico. H. N. Patterson. (Large 8vo. pp. 158, Oquawka, Jan., 1892).

This most useful catalogue of North American Plants was advertised in our last number, but it is desirable to place its publication on more permanent record. The number of species and varieties of Flowering Plants, Ferns and Fern-allies indicated by this list is 12,794, the number of species being 10,706. It has evidently been prepared with much care and is beautifully printed. It is by no means complete, however, as will be very apparent from the statement that there are at least twenty-five additional species and varieties of Ranunculaceæ in addition to the two hundred and thirty-four listed, a considerable number of them published, it should be said, after Mr. Patterson's manuscript went to press. The value of the work is enhanced by a capital index. N. L. B.

Plant-Bearing Deposits of the American Trias—The. L. F. Ward. (Reprint Bull. Geol. Soc. Am. iii. 23-31).

The author divides the plant-bearing Trias of America into four different areas, viz: Connecticut Valley, New Jersey and Pennsylvania, Virginia, North Carolina and Western. One hundred and nineteen species have been named, of which only thirty-four are common to two or more of the areas. The number of species common to the several basins are arranged in tabular form, so that the distribution may be seen at a glance. From it we may learn that the only two species which occur in both the eastern and western areas are *Cheirolepis Münsteri* and *Palissya Braunii*. There is also a table showing the percentage of common forms to the total number of forms in each area. The article ends with an attempt to correlate the American and foreign strata and the result is such as to show the importance of palæobotany in this connection. A complete list of the American Triassic species would not have made the article unwieldy, and while the author's object is accomplished without such a list, its addition would have been both of interest and value.

A. H.

Physalis, or Husk Tomato. (Cornell Univ. Agric. Ex. St. Bull xxxvii, 381).

Descriptions and figures of *Physalis pubescens*, *P. Peruviana*, *P. capsicifolia* and *Solanum muricatum*.

Principles and Methods of Geologic Correlation by Means of Fossil Plants. L. F. Ward. (Reprint Am. Geol. ix. 35-47).

The importance which palæobotany has assumed in the determination of the age of strata is dwelt upon. The author cites as an illustration the clays of Gay Head, Mass., which had been announced by stratigraphical geologists at one time or another to belong to the Miocene, Pliocene and even Quarternary age. Recent discoveries of fossil plants, however, show that at least a part of the strata are undoubtedly Cretaceous, as many of the leaves are identical with those from the Amboy Clays of New Jersey. The author incidentally raps the botanists, who, he says, are so accustomed to have the entire structure of a plant for study that they have no patience with the mere fragments upon which the palæobotanist often has to rely for determination. He claims that the necessary close study of these fragments has so sharpened the powers of observation in the latter that they are now able to act the part of teacher to the botanists. Thus he quotes the fact that the generic importance of nervation in leaves was first discovered by the study of fossil types, whereas the botanist frequently concerns himself so entirely with the mere form of the leaf that his figures and descriptions are frequently of no value to the palæobotanist. Another point, and an important one from the geological standpoint, is that the correct determination of a genus is of small importance compared to the exact description and portrayal of the specimen, the vital point being that these shall be so exact that there shall be no doubt as to the identity of a type wherever it may again be found. These criticisms might well be carefully considered by all who are engaged in descriptive work.

In describing the methods which should guide in the study of geologic correlation by means of fossil plants, a plea is made for as wide a comparison as possible with foreign forms, which are frequently transitional, and thus avoid such an error as was made in the case of our Laramie flora. The importance of tabulating the species of plants common to separate areas of supposed identical strata is urged and such a table of distribution is given for the plants in the Triassic areas of the United States.

A. H.

Silva of North America, Vol. III. Anacardiaceæ—Leguminosæ. Charles Sprague Sargent. (4to. pp. 141, Plates XCVIII-CXLVII).

The trees described and illustrated in this volume of the Silva are as follows: *Cotinus Americanus*, *Rhus Metopium*, *Rhus typhina*, *Rhus copallina*, *Rhus vernix*, L. (*R. venenata*, DC.), *Rhus integrifolia*, *Eysenhardtia orthocarpa*, *Dalea spinosa*, *Robinia Pseudacacia*, *R. Neo-Mexicana*, *R. viscosa*, *Olneya Tesota*, *Ichthyomethia piscipula*, *Cladrastis lutea*, *Sophora secundiflora*, *S. affinis*, *Gymnocladus dioicus*, *Gleditsia triacanthos*, *G. aquatica*, *Cercidium floridum*, *C. Torreyanum*, *Parkinsonia aculeata*, *P. microphylla*, *Cercis Canadensis*, *C. Texensis*, *Prosopis juliflora*, *P. pubescens*, *Leucæna glauca*, *L. pulverulenta*, *Acacia Farnesiana*, *A. Wrightii*, *A. Greggii*, *Lysiloma latisiliqua*, *Pithecolobium Unguis-cati*, *P. brevifolium* and *P. flexicaule*.

Rhipsalis Regnellii, n. sp. G. A. Lindberg. (Gartenflora, xxxix. 118-124, figs. 31, 32.)

Some Observations on the Bahamas and Jamaica. J. R. Rothrock. (Proc. Am. Philos. Soc. xxix. 145, reprint).

The Aspect of Trees in Winter. (Gard. and For. v. 50.) With illustration of a branch of *Quercus tinctoria.*

The Comparative Morphology of the Fungi. James Ellis Humphrey. (Am. Nat. xxv. 1055).

The Bearberry in Central Nebraska. Ch. E. Bessey. (Am. Nat. xxv. 1030).

Arctostaphylos Uva-ursi is reported from the basin of the Long River, Custer County.

The Effect of Mechanical Movement upon the Growth of Certain Flower Organisms. H. L. Russell. (Bot. Gaz. xvii. 8).

The Future of Systematic Botany. John M. Coulter. (Proc. Am. Ass. Adv. Sci. xl. 1891, reprint).

Thrinax Morrisii. Wendl. (Gardn. Chron. xi. 104, with illustrations.

The description of a new palm from Anguilla, W. I.

Ueber einige Lobeliaceen des Wiener Herbariums. A. Zahlbruckner. (Annalen K. K. Nat. Hist. Hof. Mus. Wien. vi. Nos. 3 and 4, 1891 reprint).

Five new species of *Centropogon* from Bolivia, Peru and Ecuador, are described as well as five new species of the genus *Siphocampylus. Synphoranthera polystachya*, Boj. Mss., is published for the first time.

What is a Diatom? Charles F. Cox. (Jour. N. Y. Mic. Society, viii. 1-28).

This a most entertaining and instructive paper. The author does not claim to have settled the question propounded, but he has certainly added materially to the sum total of our knowledge upon the subject. He shows that a study of these interesting organisms, so low down in the scale of life, brings before us most of the leading problems in biology.

The structure and life-history of the diatoms, together with the reason for assigning them to the vegetable kingdom, are ably discussed, as are also the different theories which have been framed to account for their power of motion.

Incidentally the writer pays a tribute to the diatomists who, despite the ridicule often encountered, have labored so untiringly at the markings of diatoms. Their constant demand for better lenses has led to the great improvements in objectives which have been made during the past few years, and has resulted in the production of these wonderful lenses which have proved of such great value to the biologist and rendered practicable the whole science of bacteriology.

C. H. K.

Wheat Rust: Is the Infection Local or General in Origin? H. L. Bolley. (Agric. Sci. v. 259).

Your Weeds and Your Neighbors. C. F. Milspaugh. (West Va. Agri. Ex. Sta. ii. 121).

Proceedings of the Club.

MEETING OF FEBRUARY 9th, 1892.

The President in the Chair, and twenty-five persons present.

The following named persons were elected active members: Mr. John Cocks, Dr. Wm. C. Rives, Mrs. Sarah J. Van Sicklen and Dr. C. C. Howard.

Mr. Ganong of Harvard University was elected a corresponding member.

An amendment to the Constitution, providing for two Vice-presidents instead of one, was adopted.

Dr. T. F. Allen and Mr. Thos. Hogg were elected Vice-presidents. Professor Byron D. Halsted was elected Corresponding Secretary in place of Mr. E. P. Bicknell, who resigned that office.

The following resolution was adopted: That to promote greater uniformity and correctness in the pronunciation, orthography and nomenclature of botanical names, a committee of three be appointed having cognizance of these and kindred subjects, to be called the Literary Committee, who are requested to report their observations and suggestions pertaining thereto, as often as shall seem to them expedient.

Dr. Britton exhibited a specimen of *Lœflingia squarrosa*, collected by Mr. H. J. Webber in Nebraska, this being a station for the plant much further north than any hitherto reported.

Judge Brown described an interesting collection of New York plants, accompanied by many drawings, which he had been shown at the British Museum of Natural History, by Mr. Wm. Carruthers, the Chief of the Botanical Department of that institution. The collection is in book form, and is prefixed by the following statement:

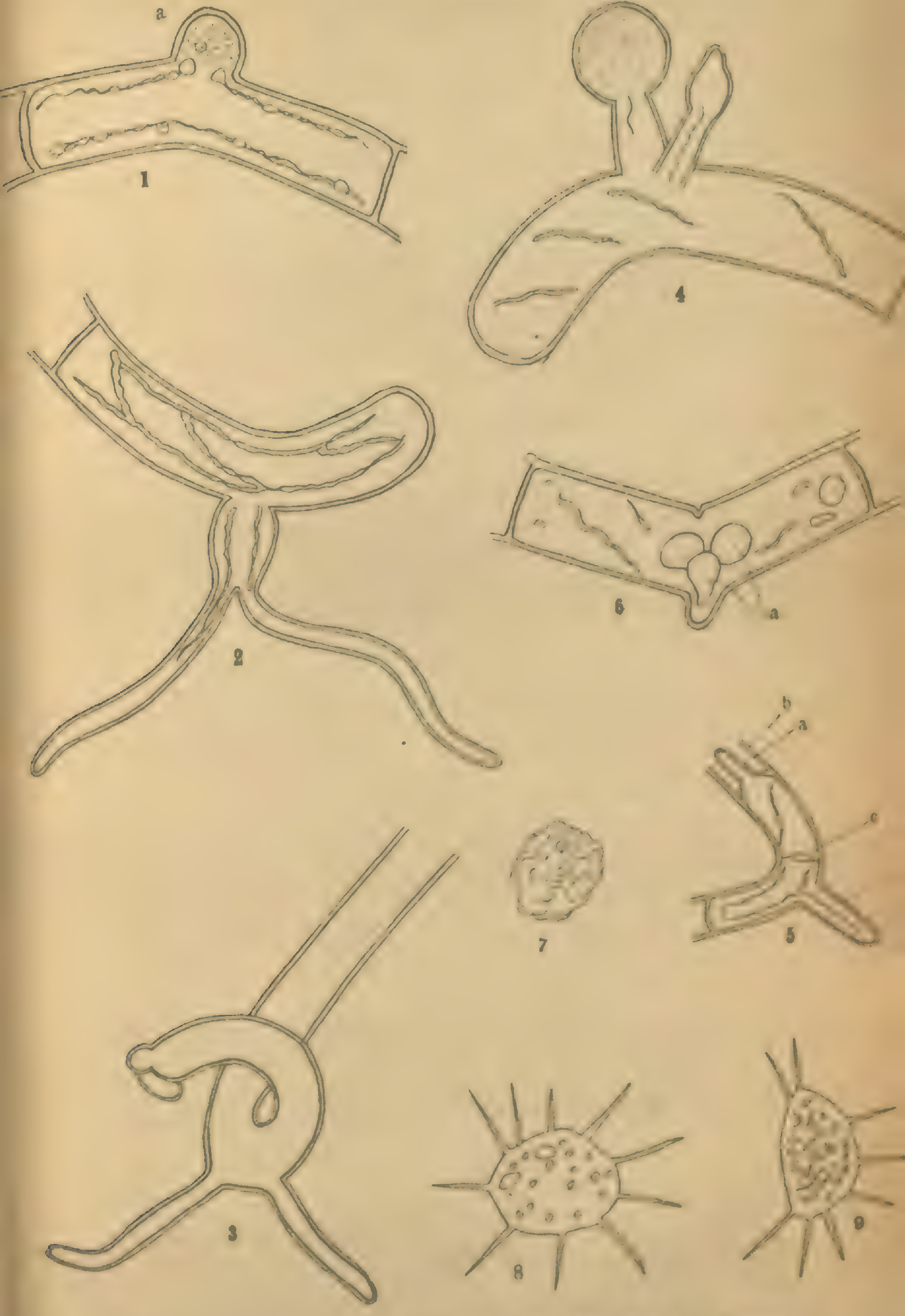
"This manuscript, which has never been printed, contains a part of the Flora of New York, and was composed by a lady, the daughter of the Governor, Cadwallader Colden, well-known for his botanical works, and a physician as well. This lady married a doctor of medicine, Farquhar, a Scotchman by birth, and she died soon afterwards. Some of the names are according to her father and according to Gronovius, and some are according to the Brandenburg Dr. Schœpff, who has read this work. The trivial names are according to Linnæus."

"This work is a remarkable one, because it is that of a lady who possessed such a love for botany that she learned Latin, and judging by its nature is so worthy and correct that it contains many, even minute, things."

This is written by F. von Langenheim, a Hessian captain in the "Feldjager" Corps, New York, May, 1782.

Dr. Britton alluded to Governor Colden's "Plantæ Coldenghamiæ in Provincia Noveboracensi Americes sponte crescentes, quas ad Methodum Cl. Linnæi sexualem Anno 1742, etc.," published in the Acta Societ. Reg. Sci. Upsala, 1749-1753, pp. 81-136, as the earliest special contribution to the Flora of the State.

Professor Byron D. Halsted presented the announced paper of the evening upon "Parasitic Fungi as related to Variegated Plants," illustrated by specimens and lantern views.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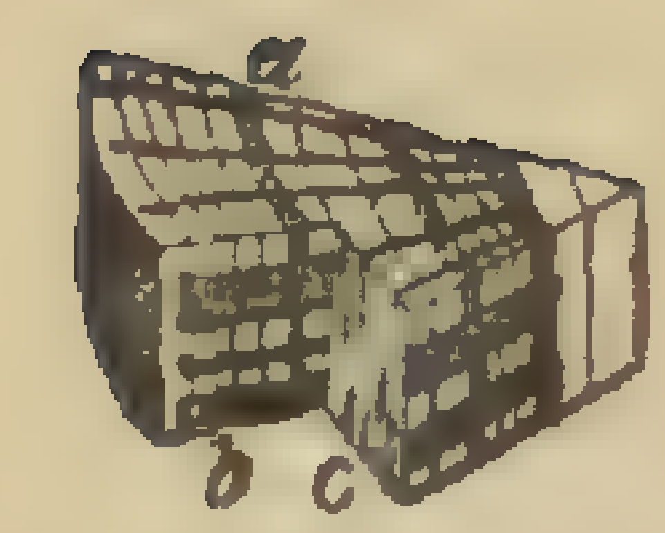

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OF THE

TORREY BOTANICAL CLUB.

A MONTHLY JOURNAL OF BOTANY.

EDITED BY

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.

A Preliminary List of the Species of the Genus *Meibomia*, Heist., occurring in the United States and British America: *Anna M. Vail* 107

The Fresh-Water Algæ of Maine, III: *F. L. Harvey* Plate CXXVI) 118

Sereno Watson: *Walter Deane* 125

Some Additions to our Eastern Flora: *Thos. C. Porter* 128

Botanical Note.—Weeds at the World's Columbian Exhibition: *Byron D. Halsted* 131

Reviews of Foreign Literature.—Dictionnaire de Botanique; Halbflechten; New Marine Diatoms.......... 132

PAGE.

Recent American Botanical Literature.—Filices Mexicanæ: Forest Trees of Oregon: New or Little-Known South American Leguminosæ; Mosses of Lancaster County, Penn.: New Plants collected by W. G. Wright in Western Mexico; Notes on Nomenclature: Notes on North American Trees; Contributions to the Flora of Central Brazil; The Tan-bark Oak; Annual Report on the Trinidad Botanic Gardens; Weeds of California; Some species of *Liatris*, and briefer notices 133

Proceedings of the Club.......... 139

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BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XIX.] New York, April 5, 1892. [No. 4.

A Preliminary List of the Species of the Genus Meibomia, Heist., occurring in the United States and British America.

By Anna M. Vail.

The genus *Hedysarum* in Linnæus' Genera Plantarum, ed. i. 225, published in 1737, and referred by him to Tournefort, comprised *Onobrychis*, *Hedysarum*, *Alhagi* and *Meibomia*. The first reference to *Meibomia,* as distinct from *Hedysarum*, that I have found is in the second edition of Ludwig's Definitiones Generum Plantarum, 156, (1747). I have not access to the first edition of that work. According to Dr. Otto Kuntze, the genus was founded by Möhring (Hort. Priv. 65, 1736), and referred by him to Heister one year ahead of the Linnæan Genera Plantarum.

According to the same author it was used by Manetti in 1751 and by Fabricius in 1753, and to these it may be added by Adanson (Fam. Pl. ii. 509) in 1763. Siegesbeck called it *Hedysarodes* in 1736, but I have not found that name used subsequent to 1737.

St. Hilaire named the genus *Pleurolobus* in 1812, and *Phyllodium* and *Desmodium*, Desvaux, appeared in 1813.

The genus *Desmodium* was elaborated by DeCandolle in the second volume of the Prodromus in 1825, and the North American species of the genus in the first volume of Torrey & Gray's Synoptical Flora in 1838, and they have been followed by all recent writers.

Thirty-nine species are enumerated in this list, which is an attempt to straighten out the rather complicated synonymy of the genus. The species of the Southwestern States are as yet little understood, and a more extensive exploration of Arizona, Texas and New Mexico will doubtless reveal new or Mexican species within our borders, and perhaps change the status of some here recognized.

My thanks are due to Dr. N. L. Britton for his help and many valuable suggestions, and also to Captain John Donnell Smith, Mr. Redfield, Dr. Sereno Watson and Prof. Macoun for their kindness in loaning their collections to me for examination.

§ 1. Pods constricted into separate semi-rhomboidal joints.

† Pod not constricted above, deeply constricted below, long-stiped; leaflets broad.

* Panicle arising from the base of the plant.

1. MEIBOMIA NUDIFLORA, (L.)

Hedysarum nudiflorum, L. Spec. Pl. 749 (1753).
Desmodium nudiflorum, DC. Prodr. ii. 330 (1825).
Meibomia nudiflora, O. Kuntze, Rev. Gen. Plant. i. 197 (1891).
Distr.—Ontario to Florida, west to Missouri and Louisiana.

** Panicle arising from the summit of the plant, leaves crowded at its base.

2. MEIBOMIA GRANDIFLORA (Walter).

Hedysarum grandiflorum, Walter, Fl. Car. 185 (1788).
Hedysarum glutinosum, Mühl. in Willd. Spec. iii. 1198 (1803).
Hedysarum acuminatum, Michx. Fl. Bor. Am. ii. 72 (1803).
Desmodium acuminatum, DC. Prodr. ii. 329 (1825).
Desmodium grandiflorum, DC. Prodr. ii. 338 (1825).
Meibomia grandiflora, O. Kuntze, Rev. Gen. Plant. i. 196 (1891).
Distr.—Ontario to Florida, west to Minnesota, Nebraska and Texas.

*** Panicle terminal, leaves scattered.

3. MEIBOMIA PAUCIFLORA, (Nutt.)

Hedysarum pauciflorum, Nuttall, Gen. ii. 109 (1818).
Desmodium pauciflorum, DC. Prodr. ii. 330 (1825).
Meibomia pauciflora, O. Kuntze, Rev. Gen. Pl. i. 198 (1891).
Distr.—New York to Florida, west to Missouri and Louisiana.

†† Pod slightly constricted above, much constricted below, joints rhomboidal or semi-rhomboidal.

‡ Trailing or reclining vines.

* Leaflets orbicular or nearly so (except in *M. lineata*, var. *polymorpha*).

‖ Leaflets 1′ or less long, racemes simple, elongated, leafless.

4. MEIBOMIA LINEATA, (Michx.)

Hedysarum lineatum, Michx. Fl. Bor. Am. ii 72 (1803).

Desmodium lineatum, DC. Prodr. ii. 330 (1825).

Meibomia lineata, O. Kuntze, Rev. Gen. Plant. i. 196 (1891).

Distr.—Maryland to Florida, west to Louisiana.

Var. POLYMORPHA (A. Gray).

Desmodium lineatum, var. *polymorphum*, A. Gray, in A. H. Curtiss' distr. Florida plants, No. 621*. Leaves varying from nearly linear to oblong, otherwise with the characters of the species.

Distr.—Florida and Louisiana.

‖ ‖ Leaflets 1–2′ long, often broader than long, hairy, lighter beneath.

5. MEIBOMIA ROTUNDIFOLIA, (Michx.)

Hedysarum rotundifolium, Michx. Fl. Bor. Am. ii. 72 (1803).

Desmodium rotundifolium, DC. Prodr. ii. 330 (1825).

Meibomia rotundifolia, O. Kuntze, Rev. Gen. Plant. i, 197 (1891).

Var. *glabrata*, A. Gray, Man. ed. v. 135 (1867), is a smooth form of *M. rotundifolia*, which, however, is most variable as to hairiness.

Distr.—Ontario to Florida, west to Missouri and Louisiana.

** Leaflets ovate or oval, racemes terminal and axillary.

‖ Corolla whitish, stipules ovate, raceme nearly simple, leaves yellowish green, reticulate, pods twisted.

6. MEIBOMIA OCHROLEUCA (M. A. Curtis).

Hedysarum humifusum, Muhl. Cat. 69, in part (1813), fide S. Watson's Biblio. Index, i. 217.

Desmodium ochroleucum, M. A. Curtis, in Canby, Proc. Acad. Philad. 1864, 17.

Meibomia ochroleuca, O. Kuntze, Rev. Gen. Plant. i. 198 (1891.)

Distr.—Delaware, Maryland, North Carolina and Florida.(?)

‖ ‖ Corolla purple, stipules subulate, racemes panicled, sometimes simple, leaves lighter beneath.

7. MEIBOMIA GLABELLA, (Michx.)

Hedysarum glabellum, Michx. Fl. Bor. Am. ii. 73 (1803).

Hedysarum humifusum, Muhl. Cat. 69, in part (1813), fide S. Watson's Biblio. Index, i. 217.

Desmodium humifusum, Beck, Bot. 86 (1833).

Meibomia glabella, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Meibomia humifusa, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Massachusetts to North and South Carolina.

‡‡ Herbs erect or ascending.

* Leaves sessile or very short petioled, lanceolate, loment 2–3 jointed, plant pubescent.

8. MEIBOMIA SESSILIFOLIA (Torrey).

Hedysarum sessilifolium, Torrey, in Curtis' Enum. Pl. Wilmington, Boston Journ. Nat. Hist. i. 123 (1834); excluding variety.

Desmodium sessilifolium, Torrey & Gray, Fl. ii. 363 (1838).

Meibomia sessilifolia, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Massachusetts to Kentucky, west to Michigan, Kansas and Texas.

** Leaves petioled, leaflets linear, pods small.

9. MEIBOMIA STRICTA (Pursh).

Hedysarum strictum, Pursh, Fl. Am. Sept. 483 (1814).

Hedysarum paniculatum, Michx. Fl. Bor. Am. ii 74 (1803), not of L.

Desmodium strictum, DC. Prodr. ii. 329 (1825).

Meibomia stricta, O. Kuntze, Rev. Gen. Plant. i. 198 (1891)

Possibly not distinct from the next.

Distr.—New Jersey to Florida, west to Missouri and Louisiana.

10. MEIBOMIA TENUIFOLIA (T. & G.).

Hedysarum sessilifolium, var. *angustifolium*, Torr. in Curtis' Enum. Pl. Wilmington, Boston Journ. Nat. Hist. i. 123 (1834). Not *M. angustifolia* (H.B.K.)

Desmodium tenuifolium, T. & G. Fl. i. 363 (1838).

Meibomia tenuifolia, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Differing from *M. stricta* in its looser inflorescence, less rigid habit and its smaller loment, which is nearly sessile in the calyx, and the joints of which are not at all concave on the back.

Distr.—* Missouri, Florida, Alabama and Louisiana.

* * * Leaves petioled; leaflets ovate, ovate-lanceolate or lanceolate.

‖ Joints of the loment longer than broad.

o Leaflets ovate, obtuse; scabrous above, pubescent and reticulate beneath.

11. MEIBOMIA CANESCENS (L.).

Hedysarum canescens, Linn. Spec. Plant. 748 (1753).

Hedysarum viridiflorum, Willd. Spec. iii. 1192 (1803), not Linn.

* Corrected to Mississippi.
Bull T.C. XXIII : 14.

Hedysarum scaberimum, Elliott, Sk. ii. 217 (1824).

Desmodium canescens, DC. Prodr. ii. 328 (1825).

Desmodium viridiflorum, DC. Prodr. ii. 329 (1825). exclu. syn.

Desmodium Aikinianum, Beck. Bot. 84 (1833).

Hedysarum Aikinii, Eaton's Man. ed. vii. 325 (1836).

Meibomia canescens, O. Kuntze, Rev. Gen. Plant. i. 195 (1891).

Distr.—Ontario to Florida, west to Nebraska and Texas.

Varying greatly in the size of the leaves and in the hairiness of the panicles, the extreme form of which is

Var. HIRSUTA (Hooker).

Desmodium Canadense, var. *hirsuta*, Hooker Comp. Bot. Mag. i. 22 (1835).

Desmodium canescens, var. *villosissimum*, T. & G. Fl. i. 365 (1838).

Distr.—Missouri, St. Louis, T. Drummond. The Drummond specimens in Herb. Torrey are without fruit.

°° Leaflets ovate-rhomboid, velvety pubescent beneath.

12. MEIBOMIA LINDHEIMERI (A. M. Vail).

Desmodium Lindheimeri, A. M. Vail, Bull. Torr. Bot. Club, xviii. 120 (1891).

Distr.—Texas and Mexico. Type Lindheimer, No. 499, from New Braunfels.

°°° Leaflets ovate, sometimes rhomboid, acuminate, glabrous, flowers and bracts large, the latter deciduous.

13. MEIBOMIA BRACTEOSA (Michx.).

Hedysarum bracteosum, Michx. Fl. Bor. Am. ii 73 (1803).

Hedysarum cuspidatum, Mühl. in Willd. Spec. Plant. iii. 2, 1198 (1803), not 1800, fide O. Kuntze, Rev. Gen. Plant. i. 134.

Desmodium bracteosum, DC. Prodr. ii. 329 (1825).

Desmodium cuspidatum, Hooker Comp. Bot. Mag. i. 23 (1835).

Desmodium Canadense, L. var. *longifolium*, T. & G. Fl. i 365 (1838).

Meibomia bracteosa, O. Kuntze, Rev. Gen. Plant. i. 195 (1891).

Distr.—Ontario to Florida, west to Michigan, Missouri and Texas.

‖‖ Joints of the loment little longer than broad.

○ Loment distinctly stalked in the calyx.

¶ Plants glabrous or nearly so (except *M. paniculata*, var. *pubens*).

+ Leaflets lanceolate or oval.

14. MEIBOMIA PANICULATA (L.).

Hedysarum paniculatum, Linn. Spec. 749 (1753).

Desmodium paniculatum, DC. Prodr. ii. 329 (1825)

Meibomia paniculata, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Ontario to Florida, west to Nebraska, and Louisiana and Texas.

Var. ANGUSTIFOLIUM (T. & G.).

Desmodium paniculatum, var. *angustifolium*, T. & G. Fl. i. 364 (1838).

There are intermediate forms between this variety and the species.

Distr.—Florida and Texas.

Var. PUBENS (T. & G.).

Desmodium paniculatum, var. *pubens*, T. & G. Fl. i. 364 (1838).

Desmodium pubens, Young, Fl. Texas, 233 (1873).

The typical *M. paniculata* of the Eastern States is glabrous; the western form is pubescent, and there are intermediate forms between *M. Dillenii* and var. *pubens*, which latter is possibly a species.

Distr.—Florida to Texas and New Mexico.

+ + Leaflets thick, broadly ovate or ovate-rhomboid, lighter beneath.

15. MEIBOMIA LÆVIGATA (Nutt.).

Hedysarum lævigatum, Nutt. Gen. ii. 109 (1818).

Desmodium lævigatum, DC. Prodr. ii. 329 (1825).

Meibomia lævigata, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Pennsylvania to Florida, west to Missouri, Louisiana and Texas.

Var. *monophylla*, Wood, Bot. and Fl. 88 (1870). I have not seen anything answering this description. It is not at all unusual for depauperate plants of the genus to run to unifoliolate leaflets.

¶ ¶ Plants more or less pubescent.

+ Leaflets broad, velvety pubescent beneath; joints of the loment 2'' long.

16. MEIBOMIA VIRIDIFLORA (L.).

Hedysarum viridiflorum, Linn. Spec. Plant. 748 (1753).

Desmodium viridiflorum, Beck. Bot. 84 (1833), not DC.

Meibomia viridiflora, O. Kuntze, Rev. Gen. Plant. i. 197 (1891).

Distr.—New York to Florida, west to Missouri and Texas.

÷÷ Leaflets broad, thin, appressed pubescent beneath; stem striate, glabrous or finely pubescent, sometimes ciliate.

17. MEIBOMIA DILLENII (Darl.).

Hedysarum Marilandicum, Willd. Spec. iii. 1189 (1803), not Linn.

Desmodium Marylandicum, DC. Prodr. ii. 328 (1825).

Desmodium Dillenii, Darl. Fl. Cestrica, 414 (1837).

Desmodium Boottii, Torrey in Curtis' Enum. Pl. Wilmington, Boston Journ. Nat. Hist. i. 93 (1834).

Meibomia Dillenii, O. Kuntze, Rev. Gen. Plant. i. 195 (1891).

Dist.—Ontario to Florida, west to Nebraska and Texas.

° ° Loment sessile in the calyx, or nearly so; leaves more or less strongly reticulate beneath.

¶ Joints of the loment 2–4.

÷ Lower leaves 1-foliolate; leaflets villose or rugose, pubescent beneath, panicles long, leafless.

18. MEIBOMIA RHOMBIFOLIA (Elliott).

Hedysarum rhombifolium, Elliott, Sk. ii. 216 (1824).

Desmodium rhombifolium, DC. Prodr. ii. 330 (1825).

Desmodium Floridanum, Chapm. Fl. 102 (1860).

Meibomia Floridana, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

The specimen labelled *D. rhombifolium*, Ell. in Dr. Torrey's hand, is identical with what is now known as *D. Floridana*, Chapm. The latter varies somewhat in the pubescence of the under surface of the leaflets, and there are apparently intermediate forms between it and *M. lævigata*.

Distr.—Virginia to Florida, west to Louisiana.

÷÷ Leaflets 3-4′ long, scabrous beneath, broadly truncate at the base.

19. MEIBOMIA TWEEDYI (Britton).

Desmodium Tweedyi, Britton, Trans. New York Acad. Sciences, vii. 183 (1890).

Mature fruit not known.

Distr.—Texas. Tom Greene Co., Frank Tweedy, 1879.

¶ ¶ Joints of the loment, 4-7.

÷ Loments prominently in pairs; leaflets oblong or oblong-lanceolate, villose beneath.

20. MEIBOMIA ILLINOENSIS (A. Gray).

Desmodium Illinoensis, A. Gray, Proc. Am. Acad. viii. 289 (1870).

Meibomia Illinoensis, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Illinois, Nebraska and Kansas.

° ° ° Loment sessile in the calyx or nearly so; leaves not reticulate beneath.

¶ Joints 4-7; leaves short petioled.

-‖- Stipules subulate, leaflets pubescent, upper leaves sessile.

21. MEIBOMIA CANADENSIS (L.).

Hedysarum Canadense, Linn. Spec. Pl. 748 (1753).

Hedysarum scabrum, Mœnch, Meth. 118 (1794).

Desmodium Canadense, DC. Prodr. ii. 328 (1825).

Meibomia Canadensis, O. Kuntze, Rev. Gen. Plant. i. 195 (1891).

Dist.—Ontario to North Carolina, west to Saskatchawan, Nebraska and Kansas.

¶ ¶ Joints 1-3, small.

÷ Leaflets scabrous, sometimes reticulate beneath, 1-2′ long.

22. MEIBOMIA RIGIDA (Elliott).

Hedysarum rigidum, Elliott, Sk. ii. 215 (1824).

Desmodium rigidum, DC. Prodr. ii. 330 (1825).

Meibomia rigida, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Massachusetts to Florida, west to Nebraska, Arkansas and Texas.

÷ ÷ Leaflets 6-10″ long, glabrous.

23. MEIBOMIA MARYLANDICA (L.).

Hedysarum Marilandicum, Linn. Spec. Plant. 748 (1753) in part.

Hedysarum obtusum, Pursh. 482 (1814), not Mühl.

Desmodium obtusum, DC. Prodr. ii. 329 (1825).

Desmodium Marilandicum, Boott in Darlington Fl. Cestrica, ed. ii. 412 (1837), not DC.

Meibomia Marilandica, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Massachusetts to Florida, west to Missouri and Arkansas.

÷÷÷ Leaflets 6-10″ long, stems and leaflets ciliate.

24. MEIBOMIA OBTUSA (Mühl.).

Hedysarum obtusum, Mühl. in Willd. Spec. iii. 1190 (1803).

Hedysarum ciliare, Mühl. in Willd. Spec. iii. 1196 (1803).

Desmodium ciliare, DC. Prodr. ii. 329 (1825).

Distr.—Ontario to Florida, west to Missouri, Texas and Mexico.

††† Pod constricted to the middle, nearly equally above and below, mostly slender at the joints, these orbicular or oval. All southern or Mexican species.

‡ Trailing or reclining vines.

* Loment more or less prominently stalked in the calyx.

‖ Leaflets broad, joints 5-8, 2″ long, obliquely oval.

25. MEIBOMIA CINERASCENS (A. Gray).

Desmodium cinerascens, A. Gray, Pl. Wright. ii. 48 (1853).

Meibomia cinerascens, O. Kuntze, Rev. Gen. Plant. i, 197 (1891).

Distr.—Arizona and Mexico.

‖‖ Leaflets lanceolate or lanceolate-oblong, pubescent, loment 3-6 jointed, joints 1″ long, nearly orbicular.

26. MEIBOMIA BATOCAULIS (A. Gray).

Desmodium batocaulon, A. Gray, Pl. Wright. ii. 47 (1853).

Meibomia batocaulis, O. Kuntze, Rev. Gen. Plant. i. 197 (1890).

Distr.—Texas to Arizona and Mexico.

‖‖‖ Stem densely uncinate-pubescent, leaves rhombic-ovate, lighter beneath, loment 4-6 jointed, joints 1½″ long.

27. MEIBOMIA UNCINATA (Jacq.).

Hedysarum uncinatum, Jacq. Hort. Schœnbr. iii. t. 298 (1798).

Hedysarum Aparines, Link. Enum. ii. 247 (1822).

Desmodium Aparines, DC. Prodr. ii. 331 (1825), fide Hemsley Biol. Centr. Am. ii. 290.

Desmodium uncinatum, DC. Prodr. ii. 331 (1825).

Desmodium Sinclairi, Benth. Bot. Sulpher, 82 (1844), fide S. Watson Biblio. Index, i. 218 (1878).

Desmodium Sonoræ, A. Gray, Pl. Wright. ii. 47 (1853), fide S. Watson Biblio. Index, i. 218 (1878).

Meibomia uncinata, O. Kuntze, Rev. Gen. Plant. i. 197 (1891).

Meibomia Sonoræ, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—New Mexico, Mexico and throughout South America.

‡‡ Herbs erect or ascending.

* Loment sessile in the calyx, or nearly so.

‖ Leaflets long, linear, 1-foliolate ; joints of the loment oval.

28. MEIBOMIA GRAMINEA (A. Gray).

Desmodium gramineum, A. Gray, Pl. Wright, ii. 46 (1853).

Meibomia graminea, O. Kuntze, Rev. Gen. Plant. i. 98 (1891).

Distr.—New Mexico and Mexico.

‖‖ Leaflets linear, lower leaves 1-foliolate, oval or deltoid ; joints of the loment nearly orbicular.

29. MEIBOMIA NOVA-MEXICANA (A. Gray).

Desmodium Neo-Mexicanum, A. Gray, Pl. Wright. i. 53 (1852).

Desmodium exiguum, A. Gray, Pl. Wright. ii. 46 (1853).

Meibomia Neo-Mexicana, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Texas, New Mexico, Arizona and Mexico.

‖‖‖ Leaflets linear to linear-lanceolate ; joints of the loment orbicular, twisted.

30. MEIBOMIA BIGELOVII (A. Gray).

Desmodium Bigelovii, A. Gray, Pl. Wright. ii. 47 (1853).

Desmodium Neo-Mexicana, var. *glabellum*, A. Gray, Pl. Wright. ii. 47 (1853).

Desmodium Neo-Mexicanum, var. *Bigelovii*, S. Watson, Biblio. Index Am. Bot. i. 217 (1878).

Meibomia Bigelowii, O. Kuntze, Rev. Gen. Plant. i. 197 (1891).

Distr.—New Mexico and Mexico.

‖‖‖‖ Leaflets ovate, 1-6′ long, loment much twisted, bracts and stipules conspicuous.

31. MEIBOMIA TORTUOSA (Sw.).

Hedysarum tortuosum, Swartz Fl. Ind. Occ. iii. 1272 (1806).

Desmodium tortuosum, DC. Prodr. ii. 332 (1825).

Meibomia tortuosa, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Florida and West Indies.

‖‖‖‖‖ Leaflets large, mostly 1-foliolate, loment much twisted.

31. MEIBOMIA ANNUA (A. Gray).

Desmodium annuum, A. Gray, Pl. Wright. ii. 46 (1853).

Meibomia annua, O. Kuntze, Rev. Gen. Plant. i. 197 (1891).

This species has been erroneously referred to *D. spirale*. There is a doubt as to the latter occurring in the United States.

The typical plant from the West Indies—a low-spreading herb, with small, ovate or ovate-rhombic leaves and very small twisted loment—may possibly occur as introduced in the Southern States.

Distr.—Texas, New Mexico and Mexico.

** Loment more or less distinctly stalked in the calyx.

‖ Joints of the loment nearly orbicular.

‡ Joints small, very slender at the joints, leaflets ½-1′ long.

33. MEIBOMIA WISLIZENII (Engelm.).

Desmodium Wislizenii, Engelm. in A. Gray, Pl. Wright. 1. 53 (1852).

Meibomia Wislizenii, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Arizona, Texas and Mexico.

‡‡ Joints large, leaflets narrowly linear, loment mostly 5-jointed, wide at the joints.

34. MEIBOMIA ARIZONICA (S. Watson).

Desmodium Arizonicum, S. Watson, Proc. Am. Acad. xx. 363 (1885).

Distr.—Arizona.

‖‖ Joints of the loment oval.

‡ Joints 2½″ long, leaves conspicuously yellowish green, lighter beneath.

35. MEIBOMIA GRAHAMI (A. Gray).

Desmodium Grahami, A. Gray, Pl. Wright. ii. 48 (1853).

Meibomia Grahami, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—New Mexico, Arizona and Mexico.

‡‡ Joints 2″ long, leaves ovate, 1-foliolate.

36. MEIBOMIA WRIGHTII (A. Gray).

Desmodium Wrightii, A. Gray, Pl. Lindheimer. Bost. Journ. Nat. Hist. vi. 177 (1850).

Meibomia Wrightii, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—Texas, New Mexico and Mexico.

‡‡‡ Mature joints about 4″ long, leaflets light green, scabrous.

37. MEIBOMIA PSILOCARPA (A. Gray).

Desmodium psilocarpum, A. Gray, Pl. Wright. i. 48 (1853).

Meibomia psilocarpa, O. Kuntze, Rev. Gen. Plant. i. 198 (1891).

Distr.—New Mexico and Mexico.

§ 2. Pod not constricted into separate joints, straight above, only slightly constricted below.

* Plant erect or accumbent, leaves dark-green, coriaceous, much reticulated.

38. Meibomia incana (Swartz).
Hedysarum incanum, Sw. Fl. Ind. Occid. 1265 (1806).
Desmodium incanum, DC. Prodr. ii. 332 (1825).
Meibomia adscendens, var. *incana*, O. Kuntze, Rev. Gen. Plant. i. 195 (1891).
Distr.—Introduced into Florida.

** Plant low and spreading, loment ½′ or less long.

39 Meibomia triflora (L.).
Hedysarum triflorum, Linn. Spec. Plant. 749 (1753).
Desmodium triflorum, DC. Prodr. ii. 334 (1825).
Meibomia triflora, O. Kuntze, Rev. Gen. Plant. i. 197 (1891).
Distr.—Introduced along the Florida coast.

The Fresh-water Algæ of Maine.—III.

(Plate CXXVI.)

By F. L. Harvey.

Since the second article upon the Algæ of Maine was written, we have occasionally examined gatherings in connection with laboratory work and below give the forms not before reported; also additional notes upon species before recorded. The most of the material came from Pushaw stream, near where it leaves the lake, and was attached to submerged sticks and stones. A rich gathering was also taken from a spring in a low meadow on the college farm. Accompanying this article is a plate illustrating some forms regarded as new, also other forms reported before as new and now figured. Other page and plate references are to Wolle's Fresh-water Algæ and Desmids of the U. S., the classification in those works being followed. We are again indebted to Mr. Wolle for suggestions and assistance. Unless otherwise credited the specimens were collected by the writer.

CLASS II.—CHLOROPHYCEÆ.

Family V.—Coleochætaceæ.

151. *Coleochæte soluta*, Pringsh., p. 64, Pl. LXXII.—Our specimens are similar to Fig. 3. in form, but sterile and only 11-15

μ d. With *Batrachospermum* in a ditch, above dam at Chemo stream. August 20, 1890.

Family VIII.—Confervaceæ.

152. *Chætophora pisiformis*, (Roth.) Ag., p. 116, Pl. CIII.—Associated with above and attached to *Batrachospermum*. Diameter of filaments in our own specimens 5-9 μ. Articulations 1-3 times as long as wide. Branchlets from 4-5 times as long as wide. Terminal cells more blunt than described by Wolle.

Family X.—Vaucheriaceæ.

153. *Vaucheria geminata*. (Vauch.) D.C., p. 151, Pl. CXXVIII.—Associated with the above. August, 20, 1890.

Family XII.—Volvocaceæ.

154. *Eudorina stagnale*, Wolle, p. 160, Pl. CLII.—Cœnobium 150 μ, containing only sixteen cells each 20 μ. Our specimen contained no green in the cytoplasm between the cells. Associated with diatoms, desmids and filamentous algæ in Pushaw stream.

155. *Gonium pectorale*, Mueller, p. 163, Pl. CLI.—Meadow spring on college farm, Orono, Me. Not abundant. October, 1891.

Family XIII.—Protococcaceæ.

156. *Scenedesmus dimorphus*, Kg., p. 173, Pl.CLVI.—Pushaw stream, October, 1890.

157. *Protococcus viridis*, var. *Wimmeri*, Wolle, p. 183, Pl. CLXI. Figs. 14-20.—Our specimens were dark green and measured 51 μ d. Pushaw stream among algæ. October, 1891.

Family XIV.—Palmellaceæ.

158. TETRASPORA MACROSPORA, n. sp.

Thallus membranaceous, with firm, gelatinous, transparent interior, small (about 1½ inches long), irregularly expanded and divided, verrucose, free, light green. Cells spherical or oblong, granular, geminate, quaternate or finally scattered, 5-16 μ d, 10-13 μ a common size.

Floating free in a spring on the college farm, Orono, Me. October, 1891. F. L. Harvey.

Fig. 1, geminate naked spore; fig. 2, quaternate spores attached; fig. 3, quaternate spores separated; figs. 4 and 5, large spores showing enclosed daughter cells, which are only sparingly found in the thallus; fig. 6, very large oblong spore, 20 by 30 μ, which showed motion; probably zoospore. The zoospores were sparingly scattered through the thallus, and the same color and of the same granular nature as the other spores. Our specimens harbored diatoms and infusoria but no filamentous algæ. The form of the thallus of this species is more like *T. expansa* (Kg.), Kirch, but the spores are larger and exceed those of all the species mentioned by Wolle, hence the name *T. macrospora.*

159. *Dimorphococcus cordatus*, Wolle, p. 199, Pl. CLX.—Among algæ, Pushaw stream. October, 1890.

160. APIOCYSTIS ELONGATA, n. sp.

Thallus obovate or narrowly pear-shaped, pale green, the cavity filled with gelatinous matter in which are imbedded the gonidia, at first about four and increasing with age. Length of thallus in the largest specimens 80 μ, and width 30 μ. The smaller forms were much more narrow in proportion to the length. Gonidia 7-11 μ. In the same gathering were free swimming zoospores about the size of the gonidia, and though we did not establish their relation to this species, presume they belonged to it.

We give several figures: Figs. 7 and 6, full grown thalli; figs. 8 and 10, younger forms observed; fig. 11, thallus budding. This seems to differ from *A. Brauniana*, Haeg., in the smaller more elongate form and larger gonidia. Spring pool, college farm. October 28, 1891. F. L. Harvey.

161. *Craterospermum lætevirens*, A. Br., p. 235, Pl. CL.

Mr. Wolle says on page 235 F. W. Algæ of the U. S., "that the only specimens recognized as possibly belonging to this genus were collected July, 1880, in Green Pond, N. J. The conjugation was complete, but the spores imperfectly developed, hence my hesitancy in calling it a pronounced species of this genus."

It will therefore be interesting to botanists to know that the writer has found this species in conjugation and with perfect zygospores in the Penobscot River at Orono, Me. The specimens were collected in a mill pond while the gates were open and the water very low. When the pond was full the plant must have been covered with two feet of water. We have made drawings of four fruiting filaments.. It will be noticed that the length of the neck between the filaments is quite variable.

In fig. 12 *a* and *b* the zygospores are spherical; in fig. 12 *c* barrel-shaped; in fig. 12 *d* the conjugation seems to have taken place between the end of one filament and the side of another. The conjugation does not always occur the same distance from the ends of the filaments. Our specimens were not so large as those shown by Wolle, the filaments being only 35 μ d. The zygospores were dark green and about 60 μ d. Some of the cells were fully twelve times as long as wide and others only four times as long. The plant mass was submerged and attached to sticks. Collected October 3, 1891. F. L. Harvey.

Family XVII.—Desmidieæ.

162. *Desmidium Baileyi* (Ralfs.) Wolle, p. 27, Pl. II. Our specimens not twisted. The excavations between the angles longer and narrower than in Wolle's figures, and the edges of the cells slightly concave. This may prove to be a new species. Pushaw stream, among algæ. October, 1890.

163. *Sphærozosma vertebratum* (Breb.) Ralfs., p. 30, Pl. IV.—Our specimens were from 15-20 μ wide and enveloped in a mucous sheath fully 60 μ wide. The cytoplasm was sometimes cruxiform in the cells. The filaments were apparently without twist. Attached to logs in the Penobscot River. October, 1890.

164. *Closterium subtile*, Breb., p. 158 (Appendix), Pl. VII.—Our specimens were sometimes 5 μ d. Swamp back of college woods, Orono, Me.

165. *C. attenuatum*, Ehrb., p. 41, Pl. VIII.—The ends in our specimens more attenuated than Wolle's figure. Frog pond, Orono, Me.

166. *C. moniliferum*, Ehrb., p. 45, Pl. VII.—Chloroplyllous granules large, fully one-third the diameter of the cell where they occur, and five in each half cell. Our specimens were about 47 x 306 μ. Spring, college meadow, Orono, Me. Oct., 1891.

167. *C. rostratum*, Ehrb., p. 46, Pl. VIII.—25 x 385 μ. Pushaw pond. Much longer than type. Probably new. Oct., 1890.

168. *C. Kuetzingii*, Breb., p. 47, Pl. VIII.—Specimens 17 x 460 μ. Pushaw stream. Oct., 1890.

169. *Docidium Baculum*, (Breb.), D. By., p. 49, Pl. XI.—Ends truncate, sides nearly parallel, vacuoles absent. The measurements 25 x 425 μ in our specimens. Spring in meadow, college farm. Oct , 1891.

170. *Cosmarium galeratum*, Nord., p. 70, Pl. XVI.—Spring, college meadow. Oct., 1891.

171. *Cosmarium protractum*, (Næg.), Archer., p. 83, Pl. XVII. —Meadow spring, college farm, Orono, Me. Oct., 1891.

172. *C. Beckei*, Wolle, —— Pl. L.—Our specimens only 1.5 μ d, and the cytoplasm collected in a ball. Meadow spring, college farm. Oct., 1891.

173. *Xanthidium armatum*, (Breb.) Ralfs, p. 92, Pl. XXI.—Spines shorter than figured by Wolle, but much like fig. 2; only 45-50 μ. Johny Mack Brook, Orono, Me. Oct. 1890.

174 *Euastrum Pokornyanum*, Grun., p. 104, Pl. XXVII.—Spring, college meadow, Orono, Me. Oct., 1891.

175. *E. pingue*, Elf., p. 105, Pl. XXVII.—With the above. Orono, Me. Oct., 1891.

176. *Micrasterias fimbriata*, Ralfs, forma, *nuda*, Wolle, p. 110, Pl. XXXVI., Fig. 4.—Our specimens 275 μ d. Pushaw stream, near the lake; among algæ attached to submerged sticks. Oct., 1890.

177. *Staurastrum aviculum*, Breb., p. 123, Pl. XL., var. *brevispinum*, n. var., Pl. I., Fig. 13.—The type of this species was reported in Article I., No. 52, but since then we have found var. *brevispinum*, which differs from the type by being larger (35 μ d); the spines shorter and thicker, and the sides of the end view concave. None of the type form were found with this. Pushaw stream, among algæ. F. L. Harvey. Oct., 1890.

178. *S. polymorphum*, var. PENTAGONUM, n. var.

Broadly elliptical, sides tapering gradually into three processes tipped with spines; end view pentagonal; angles blunt and tipped with three spines; diameter 48 μ. Sphagnum swamp, college farm. F. L. Harvey. 1890.

The more convex ends, larger size and pentogonal end view separate it from the type, with which we did not find it associated. See fig. 14, side view; fig. 15., end view.

179. *S. nanum*, Wolle, p. 138, Pl. XLIV.—Our specimens granulose punctate. Pushaw stream. Oct., 1891.

180. *S. Sebaldi*, var. QUARTERNUM, n. var. Distinguished from the type by absence of spines; smaller size (5 μ), broader appearance and quadrangular end view. Fig. 16 side view; fig. 17 end view. Pushaw stream. Oct., 1890. F. L. Harvey.

181. *S. Eustephanum* (Ehrb.), Ralfs, p. 147, Pl. XLVIII.—The peculiar form shown at fig. 7 is doubtfully referred to the above species. It was 55 μ broad including the spines, and enclosed in a hyaline sheath with a dentate border which was over 75 μ d. The cytoplasm of the included form was dark green, and the half cells not symmetrical, the smaller half cell having only three processes. Only one specimen observed. Sketched for the writer by F. P. Briggs. Pushaw stream. Oct., 1890.

182. *S. arctiscon*, Ehrb., var. CRENULATUM, n. var.—Somewhat smaller than type, half cells more rounded, processes thicker and with crenulate margins (fig. 18). Pushaw stream. Oct., 1890. F. L. Harvey.

Family XVI.—Conjugatæ.

183. SPIROGYRA ÆQUALIS, n. sp.

Diameter of vegetative filaments quite constant, about 45 μ; 5-10 times longer than broad; spiral single (rarely two), making usually 5 to 10 turns, though 6, 7, 8 and 9 were occasionally observed; end inlaid, chlorophyl of the bands coarsely granular with about six large nuclei to each turn. Sporiferous cells not swollen; same width and length as the vegetative, and often curved; conjugation lateral, zygospores elliptical or spherical; 40 x 40 μ, 45 x 45 μ, 45 x 75 μ and 45 x 105 μ were the dimensions observed. The spores were as wide as the filaments, extending to the walls, which were not inflated; scalariform conjugation not observed; lateral conjugation quite abundant; plant in mass, grass green and slippery, spores somewhat darker green; double and single spirals were observed in contiguous cells of the same filament.

Abundant in pools in a swamp on the college campus. Oct., 1891. Collected by F. L. Harvey. (Figs. 19-21).

The replicate ends of the cells, the single spiral, and the smooth membrane of the spores, puts the plant into the *S. tenuissima* section of Wolle. The only plant mentioned at all related to it is *S. Weberi*, Kg., with which it agrees in not having the fructiferous cells inflated, but from which it differs by the much greater diameter of the filaments, greater breadth in relation to the length of the cells, and the more compact spiral.

184. *S. longata* (Vauch.) Kg., p. 214, Pl. CXXXV.—Low ground pool. Orono, Me. Mr. Wilder Colby.

185. *S. dubia*, Kg., p. 220, Pl. CXXXV. Associated with the above. Mr. Wilder Colby.

CLASS III.—CYANOPHYCEÆ.

Family XVIII.—Nostocaceæ.

186. *Nostoc rupestre*, Kg., p. 283, Pl. CXCVII.—Reported from Houlton, Me., but since observed at Bradley, Me. Associated with *Vaucheria geminata* in Chemo stream. Aug., 1890.

187. *Chamæsiphon incrustans*, Grun., p. 295, Pl. CC.—Our specimens young; only 5 x 8 μ, and rounded above; attached to filamentous algæ singly and in clusters. Rather abundant. Spring, college meadow. Oct., 1891.

188. *Oscillaria natans*, Kg., p. 314, Pl. CCVI.—Filaments solitary; among algæ attached to sticks. Pushaw stream. Oct., 1890.

189. *Oscillaria princeps*, Vauch., p. 317, Pl. CCVII.—Our specimens bluish green; cells 5 to 1 in diameter; end cell rounded; clear and twice as long as the others; filament straight and not narrowing toward the end; 30 μ d. Pushaw stream among algæ. Oct., 1890.

190. *Merismopedia convoluta*, Breb., p. 326, Pl. CCX.—Our specimens bluish green; colonies 31 μ, attached to spruce logs floating in the Penobscot. Orono, Me. Oct., 1890.

EXPLANATION OF PLATE CXXVI.

Fig. 1. *Tetraspora macrospora*, geminate spore.
Figs. 2 and 3. *Tetraspora macrospora*, quaternate spores.
Figs. 4 and 5. *Tetraspora macrospora*, large spores with daughter cells.
Fig. 6. *Tetraspora macrospora*, large motile zoospore.
Figs. 7–9. *Apocystis elongata*, full grown Thalli.
Figs. 8–10. *Apocystis elongata*, younger forms observed.
Fig. 12. *Craterospermum lætevirens; a* and *b*, spherical zygospores; *c*, barrel-shaped zygospores; *d*, abnormal conjugation.

Fig. 13. *Staurastrum aviculum*, var. *brevispinum*, side view.
Figs. 14 and 15. *Staurastrum polymorphum*, var. *pentoganum*.
Figs. 16 and 17. *Staurastrum Sebaldi*, var. *quarternum*.
Fig. 18. *Staurastrum arctiscon*, var. *crenulatum*.
Fig. 19. *Spirogyra æqualis*, sterile filament.
Figs. 20 and 21. *Spirogyra æqualis*, fertile filaments.
Fig. 22. *Staurastrum eustephanum*, young encysted.
Fig. 23. *Xanthidium cristatum*, var. *truncatum*, Harvey. No. 122, Art. II., Me. Algæ, BULLETIN, Vol. XVI., p. 186.
Figs. 24 and 25. *Euastrum verrucosum*, var. *simplex*, Joshua. No. 46, Art. I., Me. Algæ, BULLETIN, June, 1888, p. 160.
Figs. 26 and 27. *Staurastrum saxonicum*, var. *pentagonum*, Harvey. No. 62, Art. I., Me. Algæ, BULLETIN, June, 1888, p. 161.

Sereno Watson.

BY WALTER DEANE.

Systematic botany has sustained a most serious loss in the recent death of Dr. Sereno Watson, Curator of the Harvard College Herbarium. It is always with a feeling of deep sorrow that we record the death of a man who has made himself famous by his eminence in science, but far deeper is our loss when, to his scientific attainments is added the kindly spirit which prompts the scholar to aid and encourage those seeking his assistance. Such was Dr. Watson. Reserved and retiring by nature, he rather shrank from society, and preferred to devote himself almost entirely to his own labors. But it was in the herbarium especially that his gentle nature and his readiness to help those about him were shown. He was never too busy to stop and ask a friendly question or give a courteous answer. How many times has he paused in his own work to help unravel some knotty problem put before him! But, to the botanical world at large, he will always be known as a master of systematic botany.

Dr. Watson was born at East Windsor Hill, Connecticut, December 1st, 1826. After graduating at Yale College in 1847, he taught school for six years in New England, Pennsylvania and New York, besides holding the position of tutor in Iowa University. A portion of this time he spent at East Windsor and at the University of New York in studying medicine. He continued his studies from 1853 to 1855, with his brother at Quincy, Illinois, where he practiced medicine for two years after. Though possessing a general interest in botany all this time, he did not, until 1867, give himself up entirely to its pursuit. He spent five years, from January, 1856, to April, 1861, at Greensboro, Alabama, as Secretary of the Planters' Insurance Company, and for some years after this he assisted Dr. Henry Barnard, of Hartford, Connecticut, in his literary work.

His botanical career may be said to have begun when he joined the Clarence King Expedition as a volunteer botanist, in July, 1867. This expedition had for its object the geological exploration of the 40th parallel in the Western United States, and Prof. W. W. Bailey was botanist in charge. In March, 1868, Prof. Bailey was obliged to resign his position, and Dr. Watson became botanist to the expedition. The elaboration of the collections made was done mainly at Prof. D. C. Eaton's Herbarium at Yale College, New Haven, Connecticut, but he visited, also, the Gray Herbarium at Cambridge to complete his study of some of the types of our western plants. Vol V. of the U. S. Geological Exploration of the 40th Parallel contains the results of this work. It is a splendid example of critical acumen.

His connection with the Gray Herbarium began in 1870, and continued till his death. He had charge of the immense collections there deposited, as well as of the library, and here it was that Dr. Watson's literary botanical work was mainly done. Eighteen Contributions to American Botany appeared from his pen between the years 1873 and 1891. Most of them were published in the Proceedings of the American Academy of Arts and Sciences. The value of these contributions cannot be overestimated. They contain, besides many other valuable articles, monographs on the Roses of North America, the North American Liliaceæ and Chenopodiaceæ, and on many of our important genera, as Lupinus, Oenothera and Eriogonum. Hundreds of new species are described in these papers. Dr. Watson's habit of careful observation, in whatever branch of study he had been pursuing, especially fitted him for this kind of work, and the value of his descriptions is abundantly attested by all botanists.

In 1878 was published the Biographical Index to North American Botany, Part I., Polypetalæ, a work of great value, which it is much to be regretted that he could not complete. The first volume of the Botany of California, by Dr. Watson, Dr. Asa Gray and Prof. W. H. Brewer, appeared in 1876, followed in 1880 by Vol. II., published by Dr. Watson. The two volumes contain nearly twelve hundred pages, and are a monument to the authors. Dr. Watson assisted in writing the botanical portion of the Century Dictionary in the earlier numbers of the work. He contributed also to many scientific journals, the BULLETIN containing many of his papers. He was a warm friend of the late Leo Lesquereux, bryologist, and, on the death of Mr. Thomas P. James, with whom Lesquereux was publishing a Manual of the Mosses of North America, Dr. Watson undertook to complete the publication of the work, owing to Lesquereux's failing health, and he issued the volume in 1884. In 1889, he published, in connection with Prof. J. M. Coulter, the Sixth Edition of the Gray Manual of the Botany of the Northern United States. This work was eagerly looked forward to, and joyfully welcomed by all students of the flora of the Northeastern United States, for the last edition had been published as far back as 1867. The western range of the old Manual is extended in this edition to the one hundredth meridian, in order to connect it with the Manual of the Rocky Mountain Region, by Prof. Coulter. A second issue of this work has already appeared.

Dr. Watson was a member of many scientific societies at home and abroad, and from Iowa University he received the degree of Ph.D. His career in Cambridge was marked by the most indefatigable work. His connection with the Herbarium involved many duties relating to the care of the plants under his charge, and of the library, and it is a wonder that he was able to accomplish so much original work. He rarely took even a short vacation, and it was seldom that he was not to be found surrounded by his books and herbarium sheets in the familiar room, sanctified for so many years by the presence of Dr. Asa Gray. To Dr. Watson most befittingly it fell to carry on the Synoptical Flora of North America, which it is the earnest wish of every botanist to see carefully completed. He had worked harmoniously so long with Dr. Gray, that he thoroughly understood the plan on which the great Flora was to be continued. Unfortunately he did not live to do much in this direction.

During the last two years of his life, he used Dr. Gray's study, instead of the Herbarium, for his special work, and, in the retirement of that room, filled with so many pleasant memories, he passed quiet and happy hours in his last labors. His peaceful life in Cambridge was broken by but few extended tours. He made a trip to the Northwest in connection with the Forest Department of the Census of 1880, and in 1885 he went on a collecting trip to Guatemala. He brought back a valuable collection of plants, among them twenty-five species of palms, and he published the results of his examination of a part of them in the Proceedings of the American Academy of Arts and Sciences. Unfortunately, however, he contracted malarial fever in the damp region of that tropical country, and he was never after entirely free from its effects. In 1886, in company with Dr. Geo. L. Goodale, he travelled for three months in Europe and was much benefited by the change.

About the middle of December last, Dr. Watson was taken sick with the prevailing influenza, which resulted in dilatation of the heart. For some weeks his recovery, though uncertain, was hoped for, and he himself often talked, with the greatest longing, of returning to work. But he grew weaker and weaker, till finally, on the morning of March 9th, 1892, he peacefully passed away. It was a beautiful ending to a well-spent life. The funeral services were held at Appleton Chapel, Cambridge, on March 11th, and were conducted by Rev. F. H. Smith and Rev. Dr. Alexander McKenzie in a very simple but impressive manner. The singing was by the college choir.

The pallbearers were Profs. Wm. H. Brewer, Chas. S. Sargent, Henry G. Jesup, Geo. L. Goodale and Wm. G. Farlow, Mr. W. F. Ganong, Dr. Roland Thaxter and Dr. B. L. Robinson. At Dr. Watson's own request his remains were laid in the College lot, at Mt. Auburn Cemetery, Cambridge.

He has left to the world a rich legacy in his works, and, to many of us, bright memories of a warm and loving friend.

Some Additions to Our Eastern Flora.

By Thos. C. Porter.

Eupatorium Vaseyi, n. sp. Stem slender, 2 to 3 ft. high, glabrous below, corymbosely branching above, the branches and inflorescence minutely puberulent; leaves lanceolate, narrowed toward the base, sessile, serrate with acute or acutish serratures, pinnately veined, less than 3 inches long, glabrous; heads five-flowered, larger than in the allied species; involucral bracts broader and more closely imbricated, obtuse, or some of the inner ones with a setaceous tip. Intermediate between *E. rotundifolium* and *E. sessilifolium.*

Lookout Mountain, Tenn. G. R. Vasey. 1878.

EUPATORIUM SESSILIFOLIUM, L., var. BRITTONIANUM, n. var. Stems and branches slender; leaves ovate, sessile, acute or somewhat acuminate, 1½ inches long or less, serrulate, glabrous, pinnately veined; corymbed panicles contracted, about three inches broad.

Budd's Lake, Morris Co., N. J. Sept., 1876.

This striking variety is named in honor of the author of the Catalogue of the Plants of New Jersey.

SOLIDAGO PUBERULA, Nutt., var. MONTICOLA, n. var. Stem erect, 3 to 12 inches high, usually deep purplish brown, minutely puberulent; leaves dark green; panicle a contracted thyrsus, 2 to 4 inches long; heads of flowers larger; involucral bracts lanceolate-subulate; rays conspicuous, bright yellow, even when dried; akenes pubescent.

Mt. Kineo, Maine, 1871; Dog Mountain (Mt. Desert Island), Maine, Rand; Mount Monadnock, N. H., Deane.

The dwarf forms on the tops of the highest mountains can scarcelybe distinguished from *S. Virgaurea*, L., var. *alpina*, Bigelow. At lower elevations in the same region another form of *S. puberula* occurs, which connects this variety with the type. It is taller, 3 feet high. The stems and foliage are paler, the puberulence on the stems scanty, the panicles larger, looser, branching, and the akenes pubescent with a few scattered hairs. It was collected by Mr. Edwin Faxon at Shelburne, N. H., and by Mr. Redfield on Mt. Desert Island, and may deserve varietal distinction.

SOLIDAGO HUMILIS, Pursh., var. MICROCEPHALA, n. var. Heads of flowers numerous and very small for the species, scarcely a line and a half long.

Frenchman's Camp Road, Mt. Desert, Maine, Redfield, Aug., 1891.

SOLIDAGO BOOTTII, Hook., var. YADKINENSIS, n. var. Stem erect, rather slender, 2 to 4 ft. high, more or less angled, scabrous-pubescent above; leaves lanceolate, sessile, acuminate, sparingly serrate; branches of the panicle elongated and ascending, terminated by short, secund racemes made up of a few scattered heads, either solitary or in small clusters, on short peduncles; heads four lines long or more; outer involucral bracts closely imbricated, obtuse, their tips green, the inner ones linear-oblong, pale yellow; rays conspicuous, 5 to 7; disk florets, 14 to 16; akenes puberulent.

Collected on the Yadkin river, North Carolina, by Messrs. Small & Heller, Aug. 18, 1891. No. 373. A single specimen, obtained by the Rev. M. A. Curtis years ago in the same region, exists in the Torrey Herbarium, under which Dr. Gray has written, "A great form!"

SOLIDAGO SPECIOSA, Nutt., var. PALLIDA, n. var. Stout, erect, 1 to 2 ft. high; leaves ovate, thick and coriaceous, with prominent veins, pale or whitish; heads as large as those of the type.

Bergen Park, Colorado, Aug., 1877, Greene; Mt. Mackay, Canada, Sept., 1889, Britton.

SOLIDAGO ROANENSIS, n. sp. Stems 2 to 2½ feet high, reddish, smooth below, puberulent above; leaves thin, glabrous; lower ones elliptical, sharply serrate, tapering into margined petioles; upper ones lanceolate, acute or acuminate; panicles virgate and thyrsoid, from 4 to 8 inches long; heads 4 lines high, peduncled, not closely crowded; inner bracts of the involucre linear, acuminate; outer ones shorter, somewhat obtuse; rays short, scarcely equalling the disk; akenes oblong, terete, glabrous.

Roan mountain, North Carolina, A. A. Heller, Aug. 13th, 1890. No. 88.

In general aspect and some of its characters it resembles *S. puberula*, but the foliage is quite different and the involucral bracts much narrower. The heads of flowers are those of *S. spithamæa*, but the akenes are perfectly smooth, and the inflorescence an elongated thyrse. It seems to be intermediate between the two species.

TRIPSACUM FLORIDANUM, n. sp. Culm erect, 3 feet high, rather stout, leafy; leaves 1 to 2 feet long, crowded at the base, 1 to 3 lines wide, from flattened, whitish, coriaceous sheaths and tapering into a long, involute, setaceous point; spike single, 8 inches long, drooping above; sterile flowers much exceeding the short joints of the rhachis; outer glumes oblong-ovate, narrowed to a blunt or acutish tip; pistillate joints 4 lines long.

Collected by the late Dr. A. P. Garber at Miami, Southeastern Florida, June, 1887.

Botanical Note.

Weeds at the World's Columbian Exposition. In order that the exhibition of weeds at the World's Columbian Exposition may be large, and representative of all sections of the country, the undersigned (having this feature in charge) respectfully ask for specimens of the worst weeds from all States and Territories.

It is suggested that each botanist or local collector, who may be pleased to assist in the work, secure at least three specimens each of the worst weeds in his State or section. In making the specimens it is important that the following points be considered: [1.] Seeds are especially desired. [2.] Seedlings are important in various stages of development. [3.] The root system is essential: also [4] the flower and flower cluster, and [5] the seed vessel.

It may be necessary, therefore, to secure these various essentials at different times during the coming season. If the weed is a large one stress is laid upon the procuring of specimens while they are small enough so that the whole plant, roots and all, can be mounted, without bending, upon an herbarian sheet of ordinary size, that is, not over a foot in length. They are not to be mounted, however, by the collector.

That unnecessary duplication may be avoided, persons who contemplate collecting specimens should signify their intentions to the undersigned, and allotments will then be made, the assignments depending largely upon the locality. It is hoped that each State in the Union may be represented by specimens in this national exhibit of our worst weeds.

The collecting must all be done the present season, and the specimens sent in for mounting, labeling, etc., by December 1st.

Correspondence is solicited. BYRON D. HALSTED.

Rutgers College, New Brunswick, N. J.

Reviews of Foreign Literature.

Dictionaire de Botanique. H. Baillon. (4to, 4 volumes, Paris, 1876-1892).

This most valuable work of Prof. Baillon is just completed by the appearance of the thirty-fourth fascicle. It is the greatest storehouse of botanical information extant, and the world owes its learned author a high sense of gratitude for the years of labor and research expended on it. In these four grand volumes may be found an answer to almost any question that arises in the whole broad field of botanical science; nearly every generic name ever used in either phanerogams or cryptogams is here alluded to and referred to its original place of publication; common names in all languages are given and usually extended accounts of taxonomical or descriptive terms. The work is freely illustrated. Without these books any scientific library is incomplete.
N. L. B.

Halbflechten. In Flora 1891, pp. 92-107, is an article by H. Zukal on "Halbflechten" or half-lichens. The author applies this name to three distinct classes of plants. First to certain plants having the appearance of lichens, but which are found on examination to lack the algæ, therefore really they are saprophytic fungi. Another class are said to find the suitable algæ only occasionally, and when this is the case, they unite with them, forming a regular hypha-thallus. Still a third class in which the fungus hyphæ are always found combined with algæ, but in such a manner as to resemble any ordinary fungus parasite, rather than hose known as lichen-forming parasites.

He describes three new species which may be classed as half lichens, and another which cannot be classed among these. This last is a parasite on certain *Scytonema* species and has one very interesting feature. It produces algæ galls, as the author calls them, which are inhabited by the vegetative part of the mycelium, while the fruit hyphæ penetrate the cells of the algæ and finally kill it.
E. L. G.

Diatomées espèces nouvelles marines, fossiles ou pélagiques. Prof. J. Brun. (Reprint from Memoires de la Société de physique et d'histoire naturelle de Genève, Tome xxxi., Seconde partie, No. 1; 12 plates and 47 pages of text).

In this volume Prof. Brun figures and describes eighty-eight new species and twenty-five new varieties of diatoms. He also constitutes three new genera, viz: *Cotyledon*, *Radiopalma* and *Hydrosilicon*. These are all difficult forms to place and doubtless will give rise to some discussion. The plates are of unusual excellence, being phototypes from photo-micrographs, made by Dr. H. Van Heurck and M. Otto Muller by the aid of the new apochromatic lenses of Zeiss.
C. H. K.

Index to Recent Literature Relating to American Botany.

Atriplex corrugata. S. Watson. (Bot. Gaz. xvi. 345).
A new species from Colorado.

A New Herbarium Pest. C. V. Riley. (Bot. Gaz. xvi. 334, illustrated).

Botanical Excursion to "The Chats"—A. (Ottawa Nat. v. 197).

Botanical Section—Report of. James Fletcher and others. (Ottawa Nat. v. 200).

Botanical Section of the Phila. Acad. Sci.—Report of. J. H. Redfield. (Proc. Acad. Nat. Sci. Phila. 500, 1891).

Botanical Section—Report of. Proc. Rochest. Acad. Sci. i. 120).

Lithospermum hirtum and *Veronica Buxbaumii* are among other interesting plants reported from the vicinity of Rochester. Attention is called to the curious differentiation in the size and division of the leaves of *Taraxacum officinale,* variations not noted in the botanies.

Cæsalpinia paucijuga. (Hook. Icones Plant. x. pl. 1977).

Canna flaccida. (Meehan's Month. ii. 36).

Catostemma fragrans. (Hook. Icon. Plant. x. pl. 1986).

Clematis paniculata. (Gard. & For. v. 90).

Cynoches glanduliferum. R. A. Rolfe. (Gard. Chron. xi. 204).

Das Nicht vorkommen der Wurzel von Polygala alba mit der Senega des Handels. J W. Lloyd. (Pharm. Rundsch. x. 51).

Desmid—A Proposed New. Wm. N. Hastings. (Am. Micros. Journ. xiii. 29).
Description and figure of *Gonatozygon aculeatum.*

Elms of the St. Lawrence Valley—The. T. H. Hoskins. (Gard. & For. v. 86).

Etude sur la Classification Naturelle et la Morphologie des Lichens du Brésil. Edouard A. Wainio. (Acta Soc. Fauna et Flora Fennica, vii. Helsingfors, 1890).

The entire volume of 256 pages of the acts of this Finland society is devoted to the description and classification of Brazilian lichens.

Ferns—Synoptical List. Bull. Bot. Depart. Jamaica, Nos. 22, 23, 25, 26.

Filices Mexicanæ. I., II. (Gard. & For. iv. 448–450, f. 71; 483, 484, f. 75).

An enumeration of the ferns collected by C. G. Pringle in Mexico. *Asplenium Pringlei* and *Hemionitis elegans* are figured, and *Asplenium dubiosum* is described as new.

Flora of Northern Yucatan—Observations on. Angelo Heilprin. (Proc. Amer. Philos. Soc. xxix. 137-144).

Florida Pines. (Gard. & For. v. 73; illustrated).

Flora Ottawaensis.—Additions Made Since Last Report. (Ottawa Nat. v. 204).

Forest Trees of Oregon—The. II., III. Thos. Condon. (West Am. Sci. vii. 115–117; 142-143).

Species under the genera *Picea*, *Thuya*, *Libocedrus*, *Chamæcyparis*, *Juniperus*, *Taxus*, *Quercus*, *Acer*, *Fraxinus*, *Alnus*, *Oreodaphne*, *Arbutus*, *Cornus*, *Populus* and *Prunus*.

Forest Vegetation of the Upper Mississippi. I., II. L. H. Pammel. (Gard. & For. iv. 460, 461; 472).

Fungus Diseases of Iowa Forage Plants. L. H. Pammel. (Extracts of a paper read before the Iowa Acad. Sci., reprint, no date).

Fungus Diseases of the Sugar Beet. L. H. Pammel. (Bull. No. 15, Iowa Agric. Ex. Station; illustrated).

Fungi Guaranitici. C. Spegazzini. (Rev. Argent. Hist. Nat. i. 398-432).

This is the concluding part of the descriptive list of Argentine Fungi, published by Senor Spegazzini. A very large number of new species are proposed.

Fungi—North American. A. P. Morgan. (Journ. Am. Soc. Nat. Hist. xiv. 141, contin. from xiii. 21).

Interesting Items on Diatoms. Chas. F. Cox. (Am. Micros. Journ. xiii. 32).

Jeffersonia diphylla, and Its Occurrence near Rochester—On. (Ch. S. Dodge. (Proc. Rochest. Acad. Sci. i. 175).

Leguminosæ novæ v. minus cognitæ Austro-Americanæ. P. Taubert. (Flora lxxv. 68; illustrated).

New species are described in the following genera: *Inga, Calliandra, Mimosa, Piptadenia, Cynometra, Bauhinia, Cassia, Sclerolobium, Tounatea, Sweetia, Lonchocarpus, Platymiscium.* A new genus, *Goniorrhachis*, with one species, *G. marginata*, based on Glaziou's No. 13,726, is also described and figured.

List of the Indigenous Ferns of the Vicinity of Rochester, with Notes—A. Ch. W. Seelye. (Proc. Rochest. Acad. Sci. i. 186).

Making an Herbarium, or Preserving Plants. W. J. Beal. (Science, xix. 123).

Mariposa Lilies. Ernest H. Krelage. (The Garden xli. 144; illustrated).

Notes and descriptions of seventeen species of the genus *Calochortus* cultivated at Haarlem, Holland.

Mosses of Lancaster County, Pennsylvania—Preliminary List of. J. K. Small. Pamphlet, 8 pp., published by the author. Feb., 1892.

This list of one hundred and fifty species has been compiled from the collections of Prof. Porter, with a few recent additions, the object being to "incite collectors to gather specimens in the less explored parts of the country." It is a valuable contribution to the subject of the distribution of our eastern mosses. Names of collectors and localities are given. E. G. B.

New Plants Collected by W. G. Wright in Western Mexico. B. L. Robinson. (Bot. Gaz. xvi. 340).

Ayenia Wrightii, Mimosa affinis, Buddleia Wrightii and *Citharexylum Cinoloanum* from the Mazatlan river are described as new.

Notes on the Fungus Causing Damping Off and Other Allied Forms. T. W. Galloway. (Trans. Mass. Hort. Soc. Part i. 1891).

Pythium De Baryanum and *Saprolegnia monoica*, illustrated.

Notes on Nomenclature. Geo. B. Sudworth. (Gard. & For. v. 98).

The identity of *Quercus Kelloggii*, Newberry (1857), is established with *Q. tinctoria*, var. *Californica*, Cooper (1756), which should now stand as *Q. Californica* (Cooper). The oldest specific name for *Quercus tinctoria*, Bartram (1791), is *Q. velutina*, Lamarck, published two years previous, in 1789. There are, in fact, two names older than Bartram's, as Aiton in Hortus Kewensis (1789) published the name *Q. discolor* for the Quercitron.

In Garden & Forest ii., 471, Professor Sargent gives *Quercus cuneata*, Wangenheim (1787), as the earliest reliable specific name for Michaux's *Quercus falcata*, passing over Marshall's (1785) two names, *Q. rubra digitata* and *Q. rubra montana*, on account of the general vagueness of the descriptions. Mr. Sudworth points out the advisability of inquiring if there is not sufficient reason for adopting Marshall's *Quercus nigra digitata* (1785), the identity of which with the Spanish oak he does not seem to doubt; in which case *Quercus digitata* would stand instead of *Q. cuneata*, Wangenheim, or *Q. falcata*, Michx.

Notes on North American Trees. XVI., XVII., XVIII., XIX. C. S. Sargent. (Gard. and For. iv. 340, 435, 448, 472).

Rhus venenata and *R. cotinoides* are critically discussed, as well as *Cercis reniformis*, *Robinia viscosa* and *Piscidia Piscipula*.

Notes upon Peronosporeæ for 1891. Byron D. Halsted. (Bot. Gaz. xvi. 338).

On the Seed-Coats of the genus Euphorbia. L. H. Pammel. (Trans. St. Louis Acad. Sci. v. 543, illustrated reprint).

Peculiar Forms of Proliferation in Timothy. J. W. Toumey. (Bot. Gaz. xvi. 346, with plate).

Notes on this subject may be found in Master's Vegetable Teratology, pp. 115, 138 and in BULLETIN, vii. 118, 119; xi. 120.

Pinus latifolia. T. S. Brandegee. (Gard. and For. v. 111).

Notes on this rare tree from the Santa Rita Mts., Arizona.

Possibilities of our Native Grapes. T. V. Munson. (Am. Gard. xii. 580-586).

Prunus hortulana. L. H. Bailey. (Gard. and For. v. 90).

Pucciniosira, Chrysopsora, Alveolaria, und Trichopsora, Vier neue Uredineen Gattungen mit tremelloider Entwickelung. G. de Lagerheim. (Ber. Deut. Bot. Gesel. ix. 344).

The description of four new genera and six species from Ecuador.

Reiscultur, insbesonder in Brasilien—Die. Walter May. (Bot. Zeit. l. 56).

Relationships of the Archegoniata—On the. Douglas Houghton Campbell. (Bot. Gaz. xvi. 323).

Root Foods of the Seneca Indians. G. H. Harris. (Proc. Roches. Acad. Sci. i. 106).

Schinusarten Brasiliens—Die Officinellen. Theo. Peckolt. (Pharm. Rundsch. ix. 86-89, continued).

Smuts of Oats and Wheat—Treatment of. (U. S. Depart Agric. Farmers Bull. No. v. illustrated).

Solandra grandiflora. (Gard. and For. v. 92).

Some Cercosporæ from Alabama. Geo. F. Atkinson. (Journ. Elisha Mitchell Sci. Soc. viii. part ii-i).

Southern Tomato Blight—The. Byron D. Halsted. (Miss. Agric. Ex. Sta. Bull. xix).

Spring in West Virginia. Danske Dandridge. (Gard. and For. v. 100).

Spruces and Firs on the Maine Coast. (Gard. and For. v. 97, illustrated).

Sulla presenza di Sferiti nell Agave Mexicana. Louigi Re. (Ann. R. Inst. Bot. Roma. v. 38).

Swans-neck Orchids—The. R. A. Rolfe. (Gard. and For. v. 88).

Notes and descriptions of fifteen species of the curious genus *Cynoches* from Central and South America.

Symbolæ ad Floram Brasiliæ Centralis cognoscendam. Eug. Warming. (Vidensk. Medd. Naturh. For. Kjob. 1890, 24-53; 158-165, 182-205, Tab. II-VII).

Parts 34, 35 and 36 of these studies of the Brazil flora, edited by M. Warming are contained in this volume. Part 36, devoted to the Desmidieæ, is contributed by F. Borgesen, and numerous new species are described in the genera *Closterium*, *Micrasterias*, *Euastrum*, *Cosmarium* and *Staurastrum*. Part 35 contains the Nyctagineæ, with new species of *Pisonia* described by A. Heimarl. Part 36 contains notes on Compositæ.

Tan Bark Oak—The. Carl Purdy. (Gard. and For. v. 118).

Quercus densiflora, one of the most beautiful of the Californian oaks, ranges from Monterey County north to Mount Shasta in the Coast Range, where it attains its greatest size and perfection in the

Redwood belt and is there now rapidly becoming the prey of the bark peelers. The commercial value of its bark is so great that large quantities are being hauled over rough mountain trails to the railroads or seacoast. The bark only is used and great masses of the wood are left to rot or become fuel for forest fires, and unless the onslaught is checked, the large and valuable growth of this fine oak will be entirely destroyed.

Tradescantia pilosa. (Meehan's Month. ii. 36).

Illustrated under the name of *T. rosea.*

Treatment of Smuts of Oats and Wheat. W. T. Swingle. (U. S. Depart. Agric. Farmers' Bull. No. v).

Trichomanes radicans. (Meehan's Month. ii. 33, illustrated).

Trinidad Royal Botanic Gardens—Annual Report on the. (Gov. Print. Est. Port of Spain, 1891).

This is an imposing document, minutely setting forth the work accomplished in every direction in this flourishing West Indian garden. Illustrations are given of *Couroupita Guianensis, Latania glaucophylla* and *Licuala* sp., and also elaborate diagrams of the organs by which *Coryanthes macrantha* is fertilized by a bee.

Touroulia Jenmani. (Hook. Icon. Plant. x. pl. 1998).

Weeds of California—The. E. W. Hilgard. (Gard. and For. 316, 328, 375, 424, 458, 604).

A large number of our Eastern pests are noted, such as *Brassica* sp., *Rumex* sp., *Chenopodium* sp., etc. *Portulaca oleracea* does not seem to be spreading, although it has appeared in a few localities. *Calandrinia Menziesii* is a native that is classed as a "weed" as is also *Eschscholtzia Californica, Oxalis corniculata* and *Erodium cicutarium.*

Among the Leguminosæ are mentioned *Medicago denticulata, Melilotus Indica, Lupinus formosus, Glycirrhiza lepidota.* The Umbelliferæ are said to include hardly a single plant that can be classed as an obnoxious weed. Among the Compositæ are noted *Centaurea Melitensis, C. solstitialis, Anthemis Cotula, Silbyum Marianum, Xanthium Canadense, X. spinosum, Senecio vulgaris, Sonchus oleraceus* and *Erigeron Canadense.*

Winter Rambles in the Pine Barrens. II., III. E. J. Hill. (Gard. and For. v. 74-110).

Ueber einige Licania Arten. Karl Fritsch. (Oestr. Bot. Zeitschrift, 1891, No. 1, reprint).

Owing to the name of *Licania pallida* having been published by Sagot in 1883 for another plant, the species No. 2442 of Dr. Rusby's collection from Bolivia described under that name in 1890 is now named by Dr. Fritsch *Licania Brittoniana.*

Zur Biologie der Iochroma macrocalyx, Benth. G. de Lagerheim. (Ber. Deut. Bot. Gesel. ix. 348, illustrated).

Proceedings of the Club.

WEDNESDAY EVENING, FEBRUARY 24TH, 1892.

Vice-President Mr. Thos. Hogg in the chair and twenty-five persons present.

Dr. Britton exhibited a specimen of *Sisymbrium Hartwegianum*, Fourn., collected by Mr. E. P. Sheldon of the University of Minnesota at Lake Benton, Minn.; this greatly extends the range of the species to the northeast.

Dr. Morong read the announced paper of the evening on "The Pronunciation of Botanical Names."

TUESDAY EVENING, MARCH 8TH, 1892.

Vice-President Mr. Thos. Hogg in the chair, and fourteen persons present.

The Editor was authorized to present a copy of the Preliminary Catalogue of Anthophyta and Pteridophyta reported as growing within one hundred miles of New York, 1888, to the Philadelphia Botanical Club, and the Committees on the Local Flora were empowered to confer with that organization relative to co-operation in the study of the flora of the vicinity of New York and Philadelphia.

The Literary Committee was increased from three members to four and constituted with Dr. Morong as Chairman, Miss Caskin, Miss Stabler and Dr. Wheelock as associates.

Miss Eloise P. Luquer, of Bedford, New York, and Professor Elwyn Waller, of Columbia College, were elected active members.

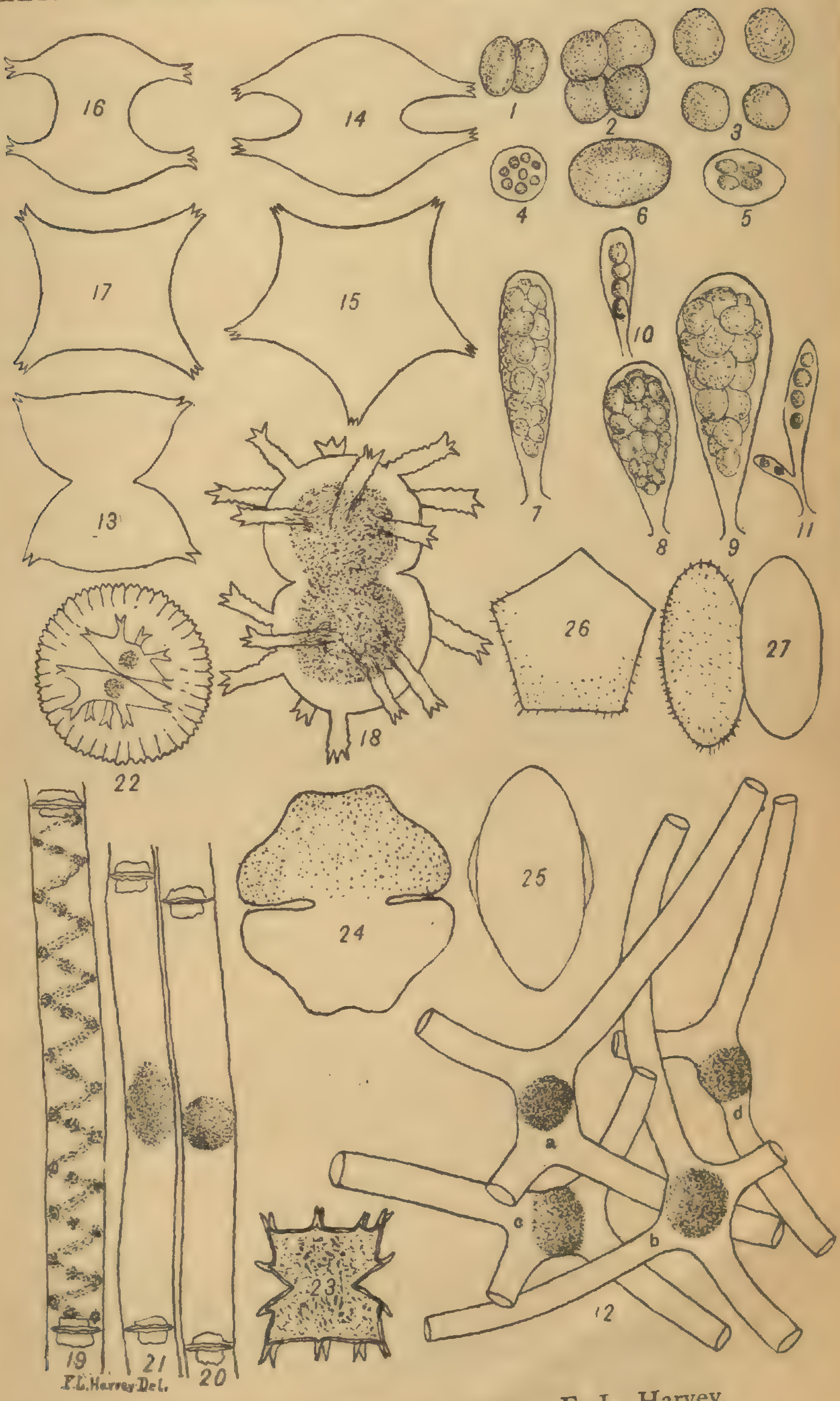
Mr. Henry Kraemer, Chairman of the Field Committee of 1891, read a report on the field excursions of last season. The report was accepted and the thanks of the club tendered to Mr. Kraemer for his efficient administration of the work of the committee. The report was referred to the Committees on the Local Flora.

Twenty-four field meetings in all were held, with an average attendance of twelve persons. At Woodhaven, Long Island, a new locality for *Menyanthes trifoliata* was detected; one of the plants observed bore two leaflets instead of three. At White Plains, Westchester Co., *Claytonia Caroliniana*, rare in the region, was collected. High Point, Sussex Co., N. J., was visited on Decoration Day, especially for the investigation of a *Vaccinium* with black fruit, found there in July of the previous year; this was found, but its flowers were nearly all past. It appears to be *V. Canadense*, var. *nigrum*, Wood, and may prove to be a distinct species. (See BULLETIN xviii. 136). The following plants of especial interest were collected: *Rhododendron canescens*, in full flower; a *Cratægus*, growing with the ordinary form of *C. coccinea*, but blooming much later, with numerous densely glandular bracts to the flowers and leaves narrowed, not truncate at the base, marking it as a distinct species, probably the *Mespilus glandulosa* of Mœnch; *Aquilegia vulgaris*, escaped along roadsides; *Equisetum sylvaticum*, and along a roadside near Port Jervis, N. Y., *Tussilago Farfara*.

On June 6th, by invitation of Mr. Jas. R. Pitcher, about sixty persons, including a part of the summer class in botany, visited the American Nurseries at Short Hills, N. J., and a most delightful day was experienced. In addition to the wealth of floral display of the great green-houses, nearly one thousand species of hardy perennials were seen growing in the open air. Messrs. Pitcher and Manda were most attentive in pointing out plants of especial interest, many of which were quite novel to many of the visitors.

Sandy Hook, N. J., was visited on July 25th, and its plants carefully listed. *Martynia proboscidea*, which has been established there for many years, was found to be scarcer than formerly. *Asplenium platyneuron*, which generally grows in rocky places, occurs here in pure sand and the introduced *Lactuca Scariola* was noticed. At Forbell's Landing, Long Island, Sept. 19th, *Cleome spinosa* was found in the woods; *Aster concolor*, *A. spectabilis*, *Diodia teres* and *Menyanthes trifoliata* were other species of interest. *Camptosorus rhizophyllus* was found at Little Falls, N. J., on October 3d, growing on a ledge of trap-rock, pointed out to the Club by Mr. Torrey.

Professor Porter sent for exhibition photographs of a decayed chip of *Quercus alba*, in which the medullary rays of the wood were shown persistent after the decay of most of the wood-cells.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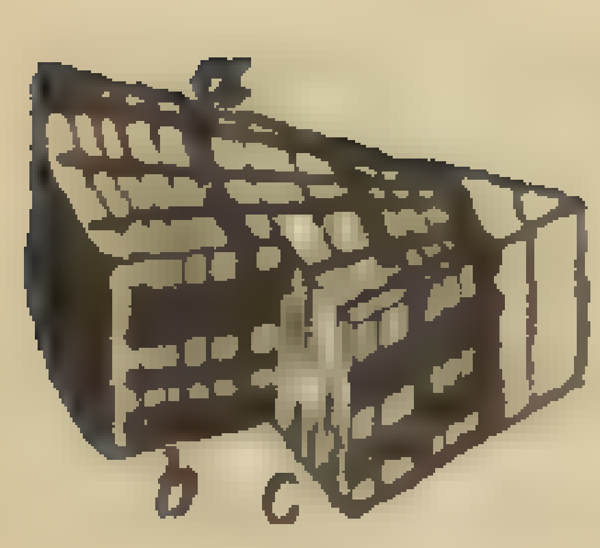

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AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.

A Century of American Weeds: *Byron D. Halsted.* ... 141

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886—XX: *N. L. Britton.* ... 148

On the Name of the American Chestnut: *Geo. B. Sudworth* ... 152

Stipa Richardsonii, Link and *Stipa Richardsonii*, Gray (Plate CXXVII): *F. Lamson-Scribner* ... 154

REVIEWS OF FOREIGN LITERATURE.—Monographie der Gattung *Caltha*; Calcium oxalate in the Bark of Trees; Le Genre *Meliola*; Note sur un *Kelloggia* de la Chine; Fossil Botany, being an Introduction to Palaeophytology from the standpoint of the Botanist ... 156

PAGE.

RECENT AMERICAN LITERATURE.—Appendix to the Catalogue of the Flora of Nebraska; Catalogue of Flowering Plants and Ferns Growing Spontaneously in the City of San Francisco; Notes on Edible Fungi; New Fungi; Neglected Diagnoses of Fungi; Monograph of the Grasses of the United States and British America; Notice of New Gigantic Fossils; Notes on the Cone-Bearers of Northwest America; Some American Forms of the Genus *Orthotrichum*; Outlines of Lessons in Botany; On Problematic Organisms; *Rubus Millspaughii*, a New Edible Blackberry; the Fairyland of Flowers; The Genus *Scolithus*; *Flora Americana*, and briefer Notices ... 160

PROCEEDINGS OF THE CLUB ... 170

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BULLETIN
OF THE
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Vol. XIX.] New York, May 5, 1892. [No. 5.

A Century of American Weeds.

THEIR ROOT SYSTEMS TABULATED.

BY BYRON D. HALSTED.

Weeds, it is claimed, do their greatest damage to crops by robbing the soil of those food elements that would otherwise go to the building up of the legitimate plants. If this be true, and the conclusion is a reasonable one, it follows that the root system of these "sappers and miners" is of special importance.

During the past summer, in the making of a collection of a hundred worst weeds as an economic herbarium to be distributed to the agricultural colleges, experiment stations and other institutions, particular attention has been given to the subterranean portion of each species, and with very few exceptions the root system, entire as possible, is shown with each specimen. In this respect the collection is unique, thanks to the untiring patience and deftness of Mr. J. A. Kelsey, my assistant, who has performed in large part the painstaking labor of collecting, pressing, and mounting the specimens.

A prolonged study of the century of specimens, or more accurately the fifty or more specimens of each of the hundred species, has led to a classification of the root systems as presented in the accompanying table. The first division of the plant is upon their duration, namely, into those with perennial, those with biennial, and those with annual roots. Next, under each of these heads the root systems are again divided into those with tap-root prominent, with roots in a cluster (fascicled), and those with the two systems more or less evidently combined. Under each of these heads the roots are again classified as to their size—figure 1 standing for the largest, 3 for medium, and 5 for the smallest, while 2 and 4 are midway from the middle size in their respective directions in the scale.

TABULATION OF ROOT SYSTEM OF WEEDS.

	Tap-Roots.	Fascicled.	Mixed.	Totals.
Perennials	1=10	1	0	11
	2= 5	4	4	13
	3= 3	4	1	8
	4= 0	2	0	2
	5= 0	0	0	0
Total,	18	11	5	34
Biennials	1=9	0	0	9
	2=1	2	0	3
	3=1	1	1	3
	4=1	0	0	1
	5=0	1	0	1
Total,	12	4	1	17
Annuals	1= 1	0	0	1
	2=16	0	3	19
	3= 9	6	2	17
	4= 2	4	2	8
	5= 0	4	0	4
Total,	28	14	7	49
			Grand Total,	100

Of those with the roots of the largest size, that is class 1, there are of perennials eleven, biennials nine, and annuals one; and all of these are with tap-roots except one, and that is a perennial with a large mass of roots extending in all directions. The plant in question is none other than the live-for-ever (*Sedum Telephium*, L..), which is able to propagate by means of its roots when broken into small pieces by implements for land cultivation. The ten perennial weeds with conspicuous tap-roots are: *Saponaria officinalis* (bouncing bet), *Hypericum perforatum*, L. (St. John's wort), *Arctium Lappa*, L. (burdock), *Cnicus arvensis* (L.), Hoffm. (Canada thistle), *Taraxacum officinale*, Weber (dandelion), *Apocynum cannabinum*, L. (dogbane), *Convolvulus arvensis*, L. (bindweed), *Convolvolus sepium*, L. (bracted bindweed), *Ipomœa pandurata* (L.), Meyer, (man-of-the-earth), and *Rumex crispus*, L., (dock). This is a big-rooted set of perennials named in the order that they appear in Gray's Manual. The wild potato-vine (*I. pandurata*) sometimes has a root that attains the size, and occasionally the form, of a boy's body, and weighs thirty-five pounds. Belonging to the same family are the two species of *Convolvulus*, and all are related to the sweet potato and yam, which are grown for their large roots. All three of these weeds are eradicated with great difficulty because of the perennial nature of the large, deeply-buried roots. The *Apocynum* is perhaps the least abundant of the weeds named above, but is remarkable for the size and persistence of its roots when once established in cultivated ground. The dandelion is familiar to all, and its tap-root, enormous for the size of the plant, rivals that of the burdock, a member of the same great family of plants. The Canada thistle has a root system peculiar to itself and renders the plant particularly difficult to eradicate, the depth to which the long roots descend in the rich loose soil being many feet. It only remains to say that the St. John's wort is not an easy pasture weed to pull on account of its deep anchorage, and the dock is likewise noted for its size and length of root.

The list of big-rooted biennials consists of: *Medicago lupulina*, L. (nonesuch), *Œnothera biennis*, L. (evening primrose), *Daucus Carota*, L. (wild carrot), *Pastinaca sativa*, L. (parsnip), *Dipsacus sylvestris*, Mill. (teasel), *Cynoglossum officinale*, L. (hound's tongue), *Echium vulgare*, L. (blue-weed), *Verbascum Blattaria*, L. (moth mullein) and *Verbascum Thapsus*, *L.* (mullein). For the size of its ærial portion the blue-weed or viper's bugloss is perhaps the largest rooted biennial, but this is closely followed by the carrot and parsnip among the lower weeds, and by the evening primrose, teasel and the mulleins for the larger species of the group. From the biennial nature of these plants it follows that if they are kept from seeding the land will soon be rid of them.

The weeds having tap-roots ranking in the second size, number twenty-two as follows: perennials, five; biennials, one, and annuals, sixteen, thus showing a large number in the last group. The perennials are: *Malva rotundifolia*, L. (mallow), a low plant with a stout, woody tap-root; *Passiflora incarnata* (passion vine), a deeply rooting noxious weed of the Southern States, *Cichorium Intybus*, L. (chicory), a tall and deeply-anchored plant. *Brunella vulgaris*, L. (heal-all) and *Nepeta Cataria*, L. (catnip) are the other two perennials of this class, both belonging to the mint family. The catnip being the larger weed, as might be expected it has the greater root. There is only one biennial in group 2, namely, *Barbarea vulgaris*, R. Br. (yellow rocket), which has a strong root like the chicory and mallow.

The annuals, while not above the average in size, make a considerable list as follows: *Brassica nigra*, L. (black mustard), *Capsella Bursa-pastoris*, (L.) Mœnch. (shepherd's purse), *Lepidium campestre* (L.), R. Br. (field pepper-grass), *Lepidium Virginicum*, L. (pepper-grass), and *Sisymbrium officinale* (L.), Scop. (hedge mustard)—all of the same family, the Cruciferæ, and very much alike in root habit. *Lychnis Githago* (L.), Lam. (corn cockle), is a tall, slender weed of the grain fields, and *Abutilon Avicennæ*, Gært. (velvet leaf), a rank pest of cultivated ground. Among the Compositæ there are *Anthemis Cotula*, L. (mayweed), and *Xanthium Canadense* (Murr.), Gray, (cocklebur), plants quite different in their size and capacity for mischief. *Datura Tatula*, L. (thorn apple), and *Solanum Carolinense*, L. (horse nettle), are two members of the nightshade family, the former a tall, much-branched, rapidly-growing weed, and the latter a low spinose pest. There are three of the pigweeds, namely, *Amarantus albus*, L. (tumble-weed), *A. chlorostachys*, Willd. and *A. retroflexus* (common pigweeds), all of which have similar sizable roots, as has likewise their cousin, *Chenopodium album*, L. (goose-foot). The last of the list is *Polygonum Convolvulus*, L. (bind-weed), a miserable vine that is strongly and deeply rooted.

There are six species in the group of weeds with moderately large root systems belonging to the fascicled type. Four of these are perennials, as follows: *Asclepias Syriaca*, L. (milkweed). When grown in its best estate in the rich prairie soil, this should perhaps be ranked in the first group. The plant as a whole is large, and grows in thick patches; the big roots make it difficult for the plow to be drawn among them. *Linaria vulgaris*, Mill. (toad-flax), fills the soil with a mat of fibrous roots, some of which are of considerable size. *Polygonum dumetorum* var. *scandens*, (L.), Gray (climbing buckwheat), has also a similiar root system. The quack grass (*Agropyrum repens*, (L.)

Beauv.,) is notorious for its roots so-called, which are, strictly speaking, a mass of tough underground stems from the joints of which small fibrous roots proceed; taken as a whole, however, the root system is large and merits the place assigned.

Of the biennials there are only two in this group of the second class, namely, *Melilotus alba*, L. (white melilot) and *Erigeron strigosus*, Muhl. (fleabane), both of which are abundantly provided with a mass of small roots.

Passing now to the mixed system it is found that there are seven distributed among the perennials and annuals; of the former there are *Leonurus Cardiaca*, L. (motherwort), the two plantains, namely, *Plantago lanceolata*, L., and *Plantago Rugelii*, DC. and the *Rumex Acetosella*, L. or sorrel. While the first three have roots quite alike, that is with a more or less strong, downward, central root and several others springing directly from it near the crown, the sorrel develops its roots horizontally and near the surface of the ground. The three annuals in group two with mixed roots are—*Solanum rostratum*, Dun. (Texas horse nettle), *Amarantus blitoides*, Wats. (spreading figweed)—both low prostrate plants—and *Chenopodium ambrosioides*, L. (goosefoot).

Of the weeds with medium sized tap-roots there are three species, namely: *Helenium tenuifolium*, Nutt., *Nepeta Glechoma*, Benth. and *Acalypha Virginica*, L The first is one of the worst weeds in the Southern States according to Prof. Tracy, who contributes the specimens to the century. In the second or ground ivy, we have a plant that forms dense masses of low growth in neglected places; while the third, the three-seeded mercury, is a widespread and common weed in moist land, particularly meadows. In the biennials of this group there is but a single species, namely: the *Echinospermum Lappula*, Lehm. (stickseed), which, while a medium sized weed, is exceedingly annoying to live stock, particularly sheep, on account of its bur-like seeds.

The annuals with average sized roots are more numerous than in the other two groups and include the following: *Brassica Sinapistrum*, Boiss. (charlock), *Raphanus Raphanistrum*, L. (wild radish), *Hibiscus Trionum*, L. (bladder ketmia), *Mollugo verticillata*, L. (carpet weed), *Diodia teres*, Walt. (button weed), *Sonchus oleraceus*, L. (sow thistle), *Polygonum aviculare*, L. (knotgrass), *Euphorbia Preslii*, Guss., (spurge) and *Euphorbia maculata*, L. (spotted spurge). It will be seen that this is a variable set, varying in size from the charlock and its cousin the wild radish down to the prostrate carpet weed and spotted spurge. All form seed in great abundance, the ketmia in large capsules, the sow thistle in heads and provided with airy balloons, but most of the species have inconspicuous seed vessels.

In the group of perennials with medium sized fascicled roots, there are four species to mention, namely: *Ranunculus acris*, L. (tall buttercup), *Hieracium aurantiacum*, L. (orange hawkweed), *Rudbeckia hirta*, L. (cone-flower) and *Cyperus rotundus*, L. (coco-grass). The buttercup is an old weed of the grass land, while the hawkweed is a comparatively new comer and is spreading rapidly. In the cone-flower we have a prairie weed that has spread eastward rapidly and vies with the common daisy for the occupation of the meadows. In the coco or nut-grass there is a very difficult pest to eradicate on account of its "nuts" below ground, which serve to spread the weed. There is but a single biennial to be mentioned here, but it is a very common one—the *Erigeron Canadensis*, L. (fleabane or horseweed). The annuals again are the largest in number, there being six as follows: *Anthemis arvensis*, L. (chamomile), *Erechthites hieracifolia*, (L.) Raf. (fireweed), *Polygonum Pennsylvanicum*, L. (smartweed), *Bromus secalinus*, L. (cheat or chess), *Panicum Crus-galli*, L., (barnyard grass), *Panicum sanguinale*, L. (crab or finger grass). The chess has the greatest variety as a weed; the fireweed is the rankest grower in places suited for it and the two *Panicums* are almost everywhere.

In the group with the root somewhat below the average in size, there are for the tap-rooted sorts only one for the biennials, namely: *Lamium amplexicaule*, L. (dead-nettle), and two for the annuals, as follows: *Stellaria media*, (L.), Smith (chickweed), *Portulaca oleracea*, L. (purslane). These are all small plants, the dead-nettle or henbit reaching highest from the ground, while the purslane is a succulent prostrate weed.

In the fascicled group for the size called number four there are two species, namely: *Ranunculus bulbosus*, L. (buttercup) and *Chrysanthemum Leucanthemum*, L. (ox-eye daisy).

It is somewhat of a surprise to find the root system of the common daisy comparatively small. It is only when the plant is old and has developed many flower stalks in a cluster that the roots become of a size to interfere at all with cultivation. Among the annuals there are four species with similar root systems, all of which are among the grasses, namely: *Bromus tectorum*, L. (chess), *Panicum capillare*, L. (witch grass), and the fox-tails, *Setaria glauca* (L.) Beauv. and *Setaria viridis* (L.), Beauv. Ordinary plants of any of these four grasses when grown separately make but a small cluster of fibrous roots.

Of those with a combination of the tap and clustered form of rooting in group four there are only two and these are both annuals and closely related, namely, *Ambrosia artemisiæfolia*, L. (ragweed) and *Ambrosia trifida*, L. (horseweed). These from their large size have root systems that are more extensive than those of many other weeds mentioned in previous groups, but in this classification it has been relative rather than absolute size that has governed in the classification. The ragweeds have a comparatively small root system.

In the last group, namely, those with the smallest root system, there are but few examples. Among the biennials there is but one and it, *Allium vineale*, L. (wild onion) is a vile pest in many dairy regions. Aside from the bulb there seems to be little else below the ground. There are four of the annuals that are here grouped, namely: *Veronica peregrina*, L. (speedwell), *Orobanche ramosa*, L. (broom rape), *Cenchrus tribuloides*, L. (sand-bur) and *Eleusine Indica* (L.) Gærtn. (wire grass). The speedwell is a short-lived weed of early summer; in the broom rape we have a parasitical pest of the hemp and some other field crops, while the last two species are grasses, one a native and particularly obnoxious on account of its spinose fruit, while the last on the list is a foreigner that is growing in numbers but not in favor among us.

[Since writing the above one change has been made in the century, namely: the substitution of *Physalis Virginiana*, Mill., for *Polygonum dumetorum*, var. *scandens*, which does not affect the classification materially.]

Rutgers College, Dec. 28th, 1891.

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XX.

(Continued from page 4).

Tessaria integrifolia, R. & P. Syst. 213. Guanai, 2,000 ft. (1714).

Tessaria absinthioides, DC. Prodr. v. 457. Tacna, Chili (1715).

Pterocaulon virgatum (L.), DC. Prodr. v. 454. Unduavi, 8,000 ft. (1611).

Loricaria thyioides (Lam.), O. Kuntze, Gen. Pl. Rev. i. 352. Unduavi, 8,000 ft. (1565).

Achyrocline saturioides (Lam.), DC. Prodr. v., Guanai, 2,000 ft. (1601); near La Paz, 10,000 ft. (1596).

ACHYROCLINE RAMOSISSIMA (Sch. Bip.) (*Gnaphalium ramosissimum*, Sch. Bip. Bonplandia, iv. 52, name only). Near La Paz, 10,000 ft. (1602). Same as Mandon's 157.

Gnaphalium purpureum, L. Sp. Pl. 854. Near La Paz, 10,000 ft. (1594); Scrata, 10,000 ft. (1595).

Gnaphalium cheiranthifolium, Lam. Encycl. ii. 752. Near La Paz, 10,000 ft. (1593); near Valparaiso (1597). (*G. paniculatum*, DC.).

Gnaphalium viravira, Mol. Hist. 354. Valparaiso (1377).

Gnaphalium Mandoni, Sch. Bip. Bull. Soc. Bot. Fr. xii. 80, name only (1598). Sorata, 13,000 ft. The same as Mandon's 155.

LEONTOPODIUM LINEARIFOLIUM (Wedd.) (*Antennaria linearifolia*, Wedd. Chlor. And. i. 150). Mapiri, 10,000 ft. (1599); Unduavi, 10,000 ft. (1600). Same as Mandon's 160 and Spruce's 5885.

Elvira biflora (L.), DC. Prodr v. 503. Yungas, 4,000 ft. (2351).

Clibadium asperum (Aubl.), DC. Prodr. v. 506. Mapiri, 5,000 ft. (2144); Reis, 1,500 ft. (2145); Yungas, 4,000 ft. (2146).

Acanthospermum australe (L.), Kuntze, Rev. Gen. Pl. 303. Mapiri, 5,000 ft. (1348).

Polymnia glabrata, DC. Prodr. v. 515. Sorata, 8,000 ft. (1669). Same as Mandon's 30, distributed as *Trigonospermum multiflorum*, Sch. Bip., but referred by Schultz in Bull. Soc. Bot. Fr. xii. 79 to this species.

Franseria artemisioides, Willd. Sp. Pl. iv. 374. Sorata, 8,000 ft. (1590).

Xanthium spinosum, L. Sp. Pl. 987. Unduavi, 8,000 ft. (1929).

Siegesbeckia orientalis, L. Sp. Pl. 900. Yungas, 4,000 ft. (2124). The same as Mandon's 231 and 232, called *S. Mandoni* by Schultz.

Jægeria hirta (Lag.), Less. Syn. Comp. 223. Sorata, 10,000 ft. (2132); Mapiri, 5,000 ft. (1618).

Eclipta alba (L.), Hassk. Pl. Rav. Jav. 528. Junction of the rivers Beni and Madre de Dios (1631; 1630).

Wulfia baccata (L. f.) Kuntze, Rev. Gen. Pl. 373. (*Coreopsis baccata*, L. f. Suppl. 380; *Wulfia stenoglossa*, DC.). Mapiri, 5,000 ft. (1705); Reis, 1,500 ft. (1706).

Wedelia subvelutina, DC. Prodr. v. 540 (*W. scandens*, Gardn.). Falls of the Madeira, Brazil (2141).

Zexmenia rudis, Baker, in Mart. Fl. Bras. vi. Pars. iii. 188. Falls of the Madeira (2142).

OYEDÆA BOLIVIANA, sp. nova. Fruticosa, ramosa, dense et minute pubescentia, 30+cm. alta; foliis ovato-lanceolatis, serrulatis, acuminatis breve petiolatis, oppositis, 8-10 cm. longis, 3-4 cm. latis, supra scabris, subtus dense pubescentibus; capitulis (cum radiis) 2-3 cm. latis. laxe corymbosis; involucris hemisphericis, bracteis lanceolatis vel oblongo-lanceolatis, acutis subcoriaceis; acheniis linearibus, exalatis, minute pubescentibus, 4 mm. longis; pappus florum disci 2-aristatus cum fere 5 aristis minutis; pappus florum radii 3-aristatus.

Yungas, 6,000 ft. 2143).

VIGUIERA CALVA (Sch. Bip.) (*Helianthus calvus*, Sch. Bip. Bull. Soc. Bot. France, xii. 79. Sorata, 8,000 ft. (1690). The same as Mandon's No. 34.

Viguiera Mandoni, Sch. Bip. Bull. Soc. Bot. France, xii. 79. Near La Paz, 10,000 ft. (1684, 1683; 2714).

VIGUIERA LANCEOLATA, sp. nova. Fruticosa vel herba perennis, erecta, ramosa; caulibus scabris; foliis lanceolatis, crenulatis, acuminatis, basi acutis, supra scabris subtus pilosis, 3-nervis, oppositis vel superne alterni, 8-10 cm. longis, 1.5-2 cm. latis; capitulis paucis, cum radiis 5-6 cm. longis, pedunculatis; involucris hemisphericis; bracteis ovato-lanceolatis, pilosis, acutis, 3-nervis; acheniis glabris.

Yungas, 4,000 ft. (2140).

Viguiera, a narrow-leaved species apparently undescribed. Near La Paz, 10,000 ft. (1689).

Viguiera. Near La Paz, 10,000 ft. (2556).

Viguiera. Unduavi, 8,000 ft. (2715). Perhaps the same as 2556.

Helianthus (?) Sorata, 8,000 ft. (2139). The same collected also by Pearce in Bolivia. Probably undescribed.

Encelia ? Unduavi (2712).

Verbesina Soratæ, Sch. Bip. Bull. Soc. Bot. France, xii. 79, name only. Sorata, 8,000 ft. (1722).

Verbesina Mandoni, Sch. Bip. Bull. Soc. Bot. France, xii. 79, name only (1721). Near La Paz, 10,000 ft. A lanceolate-leaved form.

Verbesina diversifolia, DC. Prodr. v. 615. Yungas, 4,000 ft. (2135).

Verbesina, a large-leaved species related to *V. diversifolia*, but probably distinct. Guanai, 2,000 ft. (1693).

Spilanthes Acmella, L. Mant. ii. 475. Yungas, 4,000 ft. (919).

Salmea scandens (L.), DC. Prodr. v. 493. Junction of the rivers Beni and Madre de Dios (1741).

SALMEA MIKANIOIDES, sp. nov. Fruticosa, scandens (?) pubescens, divaricate ramosa, ramulis teretibus; foliis oppositis oblongo-lanceolatis, integris, valde 3-nervis, acuminatis, 8-10 cm. longis, 2-3 cm. latis, supra scabris et intense viridis, subtus puberulentis pallidisve; petiolis 1 cm. longis; capitulis corymboso-paniculatis, numerosis pedicellatis; involucris oblongo-campanulatis 3-4 mm. altis; bracteis ovato-oblongis, obtusis, acheniis linearibus, biaristatis.

Reis, 1,500 ft. (1739).

Trichospira menthoides, H.B.K. Nov. Gen. iv. 27. Falls of Madeira, Brazil (1700).

Coreopsis spectabilis, A. Gray, Proc. Amer. Acad. v. 125. Near La Paz, 10,000 ft. (1685).

Bidens pilosus, L. Sp. Pl. 1166 (*B. leucantha* (L.), Willd.) Tacna, Chili (1620); Yungas, 6,000 ft. (1619).

Bidens rubifolia, H.B.K. Nov. Gen. iv. 237. Guanai (1642).

Bidens andicola, H.B.K. Nov. Gen. iv. 237. Near La Paz, 10,000 ft. (1688, 1687). The same as Mandon's No. 44.

Bidens humilis, H.B.K. Nov. Gen. iv. 234. Near La Paz, 10,000 ft. (2129). The same as Mandon's No. 51.

Bidens macranthus, Griseb. Pl. Lorentz. 138. Near La Paz, 10,000 ft. (1686).

Cosmos pulcherrimus, Sch. Bip. Bull. Soc. Bot. France, xii. 79, name only. Sorata, 10,000 ft. (1682). The same as Mandon's No. 54, and perhaps identical with *C. diversifolius*, Otto.

Galinsoga parviflora, Cav. Icon. iii. 41, t. 281. Sorata, 8,000 ft. (2130).

CALEA ROBUSTA, sp. nov. Suffruticosa, erecta, ramosa, ramulis densissime puberulentis; foliis sessilibus vel breviter petiolatis, coriaceis, ovatis, acutis, cordatis, reticulatis, dentatis, supra scabris, subtus glabris, 5-7 cm. longis, 2-4 cm. latis; capitulis heterogamis, corymbosis, pedunculatis, 2-3 cm. latis, multifloris; involucri hemispherici, bracteis oblongis, obtusis, imbricatis; pappi paleis subulatis, 3 mm. longis.

Yungas, 4,000 ft. (2137). Apparently the same as specimens in Herb. Kew collected by R. Pearce at Puente Grande and Quichara; these have somewhat smaller heads.

Calea, probably undescribed. Reis, 1,500 ft. (2138). Distributed as *Zexmenia* (?).

Tridax procumbens, L. Sp. Pl. 900. Unduavi, 8,000 ft. (2721).

Madia sativa, Mol. et. Don, Chil. 113. Valparaiso, Chili (2136).

Villanova oppositifolia, Lag. Nov. Gen. & Sp. 21. Sorata, 10,000 ft. (1707).

Tagetes Mandoni, Sch. Bip. Bull. Soc. Bot. France, xii. 79, name only. Sorata, 8,000 ft. (1641). The same as Mandon's No. 68.

Tagetes pusilla, H.B.K. Nov. Gen. iv. 194. Yungas, 6,000 ft. (2133). Same as Mandon's No. 69.

Porophyllum ellipticum, Cass. Dict. xliii. 46. Mapiri, 5,000 ft. (1697).

Chrysanthemum Parthenium (L.) Pers. Syn. ii. 462. Near La Paz, 10,000 ft. (1634).

Cotula pygmæa (H.B.K.), Hemsl. Bot. Biol. Cent. Amer. ii. 230. Near La Paz, 10,000 ft. (2154); Unduavi, 10,000 ft. (2552).

On the Name of the American Chestnut.

Castanea vulgaris, var. *Americana*, A.DC.—The synonymy of this plant has received considerable attention of late, although it appears that the oldest name for the European type, in the unsettled state of which our plant may be involved, has not yet been taken up.

The "*Castanea vesca*, L." of Gray's Manual (5th Ed.) and Wood's Class Book doubtless belongs correctly to Gaertner (1788), and was properly replaced in A.DC. (Prodr.) by the *C. vulgaris* of Lamarck (1783). Koch (Drendrologie, ii. Pt. 2, 20), however, took up an older name, the *C. sativa* of Miller, published in 1768 (Gard. Dict. ed. 8). This name has already been approved and the American tree related to it (Gard. and For. ii. 484, 1889; Catalogue N. J. Plants, 224, 1889; Gray's Manual, ed. 6, 479, 1889).

But the oldest name for the type must be the *Fagus Castanea* of Linnæus, published in 1753 (Species Plantarum ed. 1). DeCandolle, Koch, and others have uniformly cited Linnæus' name without question as a synonym, but, although clearly referring to this species, *Castanea* seems not to have been taken up as a specific name under the genus *Castanea*, as it doubtless should be. Accepting Michaux's varietal designation *C. vesca*, var. *Americana* of this plant as the earliest one tenable, the name for the American Chestnut would then become *Castanea Castanea* (Linn.), var. *Americana*, (Michx. f.)

A question may yet be raised, however, as to the oldest varietal name for the American tree; for it seems that Marshall (Arbustum Americanum, 46, 1785) was the first to describe our plant, and considering it a variety of the European Chestnut, designated it as *Fagus Castanea dentata*. This name antedates Michaux's *C. vesca*, var. *Americana* by eighteen years, and although its identity has not been openly questioned, it has been generally cited as a synonym of Michaux's later name.

The tenability of Marshall's name may perhaps be questioned from a technical point of view, as compared with that of Michaux's, but in weighing carefully the meaning of Marshall's rather loose and jumbled description, we certainly cannot fail to discern that our native Chestnut was the plant in hand. In first characterizing the European plant thus,—

"FAGUS-CASTANEA. The CHESTNUT TREE. The characters are nearly the same of the Beech, except the Male flowers being disposed in cylindrical katkins. The *Styles* more in number and bristly. The *Capsules* much larger, round, and set very thick with long prickly spines; containing from one to four or five, but generally two or three nuts, filled with sweet kernel—"

he shows clearly enough that he was at least thinking chestnut and nothing else. Following the above remarks he writes concerning the American tree:

"*The* Species *of Chestnut* with us are, Fagus-Castanea dentata, *American Chestnut Tree.* This often becomes a large tree, growing to a height of sixty or eighty feet, and four to five feet in diameter, sending out but few branches, garnished with long spear-shaped leaves, toothed or notched on their edges. The timber is used much for rails, splitting free and outlasting most of our Oaks. The kernel of the nuts are dried and used by some as a substitute for coffee. The wood is also burnt into coals for the use of blacksmiths, etc., but not much esteemed for common fuel."

The distinctive features pointed out in this description are perhaps badly stated, yet they are sufficient to indicate beyond a reasonable doubt that *Fagus Castanea dentata* was applied to our Chestnut; hence if we still consider our tree a variety, its name should be *Castanea Castanea* (L.), var. *dentata* (Marsh.) = *Fagus-Castanea dentata*, Marshall, l. c. = *Castanea sativa*, Mill., *var. Americana*, Sargent.

It would seem, though, in respect to the rank of our native Chestnut, that there is very good reason for considering it a species, distinct from the European type. Rafinesque (New Sylva N. Am. 82, 1836) appears to have been the first to separate our tree as a species under Michaux's varietal name, calling it *Castanea Americana.* Willdenow (1813), Nuttall (Sylva 1842), and Koch in 1873 (Drendrologie ii. 23) followed Rafinesque in maintaining it as a species and under this name; as also has Dr. Dippel very recently (Handbuch der Laubholzkunde ii. 57, 1892). It is quite probable that Marshall's earlier name was unknown to these authors, as it is nowhere cited.

Although most American botanists have been content to follow DeCandolle in holding the American tree to be only a variety, it is perhaps fully evident to many of those who have observed the living trees and herbarium specimens closely that they are wonderfully distinct in general aspect, in the habit and form of the leaves, and the size, form and taste of the fruit. The leaves of the European tree are noticeably more erect than in the American. The latter has its leaves mostly pointed at the base; while in the type they are chiefly rounded or occasionally with a heart-shaped base; moreover, as observed by DeCandolle, the European tree has a peculiar stellate tomentum on the under surface, present at least during early maturity, and in some instances much later in the season; a character which I believe is not found in the American tree. The much smaller, sweeter, and somewhat oily fruit of our tree is also in contrast with the three to four times larger and somewhat acerb fruit of the wild European plant.

Employing, therefore, the earliest name identifiable with our Chestnut, I would propose that it be called *Castanea dentata* (Marsh.)=*Fagus Castanea dentata*, Marshall (1785)=*C. vesca*, Gært. var. *Americana*, Michx. f. (1810)=*C. vulgaris*, Lam., var. *Americana*, A. DC. (1864) *C. sativa*, Mill., var. *Americana*, Sarg. (1889.)

GEO. B. SUDWORTH.

Forestry Division, United States Department of Agriculture,
Washington, D. C.

Stipa Richardsonii, Link, and Stipa Richardsonii, Gray.

BY F. LAMSON-SCRIBNER.

(PLATE CXXVII).

In the second edition of the Manual, Dr. Gray described a grass under *Stipa Richardsonii*, Link, and this has been followed in all the later editions and in Coulter's Manual of the Rocky Mountain Flora. I am convinced, however, that Gray's plant is entirely distinct from Link's, and proposed in Macoun's Catalogue of Canadian Plants (Vol. v., p. 390) that it be named *S. Macounii*, my first specimens having been received from Prof. John Macoun, the well-known Canadian botanist. The true *Stipa*

Richardsonii, Link, is a more western species, not yet found east of the Rocky Mountain region. These plants, as understood by me, are presented below.

Stipa Macounii, Scribner, Macoun Catalogue Can. Pl. v. p. 390; *Stipa Richardsonii*, Gray (non Link), Man. 2d. ed. p. 249, 6th ed. p. 641; Coulter Man. Rocky Mt. Bot. p. 408, exclusive of locality (Montana) reference; *Oryzopsis Richardsonii*, Beal, Bot. Gaz. xv. p. 111.

Petitcodiac, N. B., North Shore of Lake Superior, Lake Mistassini, N. E. T., near Edmonton on the Saskatchewan, and northerly to the Lesser Slave Lakes (Macoun Cat. iv. p. 190); Pleasant Mountain near Sebago Lake, Maine, Mt. Marcy, N. Y. (Gray Man. 6th ed. p. 641). I have it from North Conway, N. H. (C. E. Faxon), Mt. Desert, Maine (E. L. Rand), and from the Lake Superior region.

In this plant the empty glumes are sub-equal, broadly obtuse or very abruptly short pointed, 4-4.5 mm. long, the first broader than the second, slightly exceeding the flowering glume, which is rather thinly clothed with short hairs and is supported on a very short obtuse callus. Awn 8-11 mm. long. The panicle, which is 4-12 cm. long, closely resembles that of *Stipa Mongolica.*

It will be noted that this grass has been referred to *Oryzopsis*, the specific name *Richardsonii* being held under the impression that it was Richardson's plant. There is no clear cut line separating *Stipa* from *Oryzopsis*, and artificial characters are resorted to in making the division. In both genera the awn is articulated with the flowering glume, and both have a distinct callus at the base of this glume, but in one the awn is deciduous (sometimes caducous), and the callus is very short and blunt; in the other the awn is more persistent and the more prominent callus is sharp pointed. With such a limitation the border line is pretty certain to remain debatable ground, and to pronounce whether our plant is a *Stipa* or an *Oryzopsis* belongs rather to that indefinable faculty or intuition which comes with long observation and much experience in sorting material in classification. If placed in *Oryzopsis* this species must become *O. Macounii*, as the *Richardsonii*, Gray, is not tenable.

Stipa Richardsonii, Link, Hort. Berol. II. p. 245 (1833); Trin.

& Rupr. Stipac. p. 57; Scribner Bot. Gat. xi. p. 171; *Stipa Richardsonii*, var. *major*, Macoun Cat. Can. Pl. iv. p. 191.

Western North America (Richardson, Borgeau), Yellowstone National Park (Tweedy), Rocky Mountains, at Morley and westward to Donald in the Columbian Valley (Macoun), Montana (Scribner No. 341).

In this species the more widely spreading panicle is 15-20 cm. long, spikelets 7-9 mm., and awn 12-20 mm. The empty glumes are acute, as is also the callus. The differential characters given by Trinius and Ruprecht, who had evidently seen Link's specimens, are as follows: Paniculæ paucifloræ radiis inferioribus *binis*, *divaricato-patentibus*, *inferne nudis*, *versus apicem spiculas* 2-6 *gerentibus;* glumis acutis subæqualibus (superiore tantum ½ linea breviore), valvulam 2-3 lineam hirsutam æquantibus; arista subpersistente, torta, geniculata, 8-10 lineali; antheris barbulatis.

The italics are as in original. The empty glumes are described as acute, and the measurements given for the parts of the spikelet apply only to the western plant.

DESCRIPTION OF PLATE CXXVII.

A. Entire plant.
a. Spikelet from same.
c. The same with the empty glumes removed.
d. Empty glumes from a spikelet of *Stipa Macounii.*
e. Floret of same.

Reviews of Foreign Literature.

Monographie der Gattung Caltha. E. Huth. (Helios, Monat. Mittheil. Gesammptg. Naturwissenschaften, ix. 55-77; t. i.).

The author recognizes nine species, the following American: *C. sagittata*, Cav. with var. *latifolia*, *C. appendiculata*, Pers., with var. *Chilensis*, and *C. dionæifolia* from South America; *C. leptosepala*, DC., with vars. *rotundifolia* and *Howellii*, and *C. palustris*, L. with vars. *flabellifolia*, *arctica*, *parnassiifolia*, *asarifolia* and *typica* from North America.

As to the treatment of the North American plants, *C. leptosepala*, var. *rotundifolia* is based on a specimen from Dr. Gray, collected in the Rocky Mountains and preserved in the Vienna

Herbarium; the var. *Howellii* is based on the plant distributed by Mr. Howell as *C. biflora*, DC., but Dr. Huth doubts if it is the Candollean species; it is the same as Bridges' No. 2 from California. The plant collected by the Wilkes Exploring Expedition in Washington Territory, distributed as *C. biflora*, DC. is different. *C. palustris*, var. *flabellifolia*, which is attributed to Pursh, was described by Pursh as a species, and I have maintained that it should be so regarded (Trans. N. Y. Acad. Sci. ix. 5, 6); *C. dentata*, Muhl., is quoted as a synonym of this and if they are the same is the older name. *C. palustris*, var. *arctica*, Huth. (*C. arctica*, R.Br., is, according to the specimen preserved at the British Museum of Natural History, apparently *C. natans*, Pall., which species Dr. Huth does not attribute to America, although it has been found as far south as Minnesota by E. J. Hill, (BULLETIN, xvii. 99). *C. palustris*, var. *parnassiifolia*, Huth (*C. parnassiifolia*, Raf.) is said, following DeCandolle, to occur in New Jersey and Carolina, and var. *asarifolia*, Huth (*C. asarifolia*, DC.) to occur in Alaska, following the same author; Dr. Huth does not appear to have seen specimens of either of these.

N. L. B.

In the Botanisches Centralblatt, No. 6, of 1892, is a brief review of an article by Gregor Kraus, on calcium oxalate in the bark of trees. The author attempts to answer the question, Are the crystals of calcium oxalate in the bark of trees afterward dissolved and used in the plant economy, and therefore to be considered reserve material rather than excretory matter? To answer this question, he made exact determinations of the variation in quantity of this material at various seasons of the year.

A number of examples are given showing that the amount contained in winter was greatly diminished after the spring growth had commenced. Examples of this are twigs of *Ribes sanguineum*, which were found to have lost sixteen per cent. of the crystals from the 16th of December till the 27th of April. *Rosa canina* between the 17th of March and the 5th of May lost a little over twenty-eight per cent. *Pyrus Malus* from the 3rd of April to the 5th of May lost fifty per cent.

These experiments were not confined to one period of growth, but were repeated for several successive seasons. The author concludes that, contrary to the usually accepted theory, these crystals are soluble in many of the plant acids.

Farther than this, he says these acids are active only when very dilute, also that the liquid in the physiologically dead crystal-tubes has the periodically changing weak acid reaction common to ordinary plant sap, therefore contains some acids and salts. This liquid, he says, cannot be considered as in a state of rest, but is subject to constant motion and change, and thus the surfaces of the crystals are exposed to a changing stream of liquid, certain at some time to hold a weak acid.

This fact in connection with the absence of protoplasmic contents in the crystal tubes, he considers very suggestive of the functions of the crystals. This difference in the quantity of crystals in winter and spring was not confined to the bark, but was found also in rhizomes and other parts from which outgrowths spring.

E. L. G.

Le Genre Meliola—Anatomie Morphologie Systematique. A. Gaillard. 163 pp. 8vo. Paris, 1892).

In this memoir one hundred and eleven species are described and one hundred and eight figured on twenty-four plates. The species are divided into two sections: first, those having ovoid or globose asci; second, those having clavate or cylindrical asci. According to the author, the short, alternate or opposite branches of the mycelium known as hyphopodia, are only undeveloped perithecia, the number of those organs actually developing into perithecia being very small in comparison with those that remain undeveloped.

The memoir is a very interesting and valuable one, and will be read with pleasure and profit by all who are interested in the beautiful genus of which it treats.

J. B. ELLIS.

Note sur un Kelloggia de la Chine. A. Franchet. (Journ. de Bot. vi. 10).

It is interesting to note the discovery in the Chinese province Yun-nan, at an altitude of 3200 m., of a *Kelloggia* that closely resembles *K. galioides*, Torrey. The habitat of the latter is in the coniferous forests of the Sierra Nevada and the mountains of Arizona, Utah, Washington and Wyoming, and the finding of a second species demonstrates the extension into Asia of a genus hitherto considered solely American. *Kelloggia Chinensis* is another and interesting example of the simultaneous existence in North America and Central Asia of certain very characteristic plant types. Remarkable among many such cases is that of *Cypripedium arietinum*, the presence of which in the mountains of western China was most unexpected. A. M. V.

Fossil Botany, Being an Introduction to Palæophytology from the Standpoint of the Botanist. H. Graf zu Solms-Laubach. (8-vo. cloth. pp. 401; illustrated. New York. Macmillan & Co. 1891. Translated into English by Henry E. F. Garnsay and revised by Isaac Bayley Balfour).

It is necessary to say in the beginning that the term "palæophytology" is used in a very restricted sense, and hence the work does not treat of the angiosperms, which are all considered as modern types of vegetation. The opening pages are largely elementary, dealing with the phenomena of petrifaction, formation of coal, etc. The chief value of the work will be found to consist in the grouping of supposed allied organisms, and the discussion of their probable affinities in modern vegetation and between themselves. Structural botany plays an important part in the author's conclusions, and almost the entire series of forty-nine figures is the result of microscopic analysis.

It would be impossible in a brief review to give the course of reasoning by which the author arrives at his conclusions, but it is of interest to know that original investigations and comparison of the observations of others have resulted in relegating *Oldhamia* and *Vexillum* to purely mechanical causes. In regard to *Buthotrephis* and *Spirophyton* the author still seems to be non-committal, but *Arthrophycus* is permitted to remain in the domain of the botanist. *Lepidodendron*, *Lepidophlois* and *Knorria* are given equal generic rank, and *Lepidostrobus* is referred, as might be expected, to fruiting branches of Lepidodendræ. The Sigillariæ are not classed as transitional types, but are placed unequivocally with the Archegoniatæ and *Stigmaria* as the root stem of *Sigillaria*. Considerable doubt is thrown on the generally accepted ideas regarding the relations between *Calamites* and its allies, but the author is very non-committal, and we are left practically to draw our own conclusions from the mass of testimony produced. Plants of problematic or doubtful affinity are treated in the two closing chapters, but not with the same wealth of discussion that we find in the others. In this connection may be noted *Spiraxis*, *Williamsonia*, *Spirangium*, *Sigillariopsis* and *Lyginodendron*.

No matter how our future views may be changed by the discovery of new facts, this book will always be a valuable work of reference for the botanist and palæobotanist. A. H.

Index to Recent Literature Relating to American Botany.

Abnormal Ailanthus Leaflets—A Series of. Mrs. W. A. Kellerman. (Science xix. 90, 91 ; illustrated).

Anatomy of Carices. Theo. Holm. (Bot. Gaz. xvii. 56).

Appendix to the Catalogue of the Flora of Nebraska. H. J. Webber. (Trans. Acad. Sci. St. Louis vi. 1-47 ; reprint ; Contrib. Shaw School of Botany, No. 9).

Mr. Webber, in continuing his studies of the Nebraska Flora, has found many things to add to and some corrections to make in his published catalogue of 1890. These are presented in this Appendix, which enumerates 432 species not before reported from the State, making the whole Flora, as at present known, 2322 species and varieties.

Blackberry Plant—A Seedling. Mrs. W. A. Kellerman. (Sci. xix. 94, 95 ; illustrated).

Describes the changes in leaf form in a young seedling, from the entire to the multifoliate type.

Burnt Spots on Leaves. Theo. Holm. (Bot. Gaz. xvii. 89).

Butternut—The. Geo. B. Sudworth. (Hardwood, i. No. 5).

Note on the distribution of and the durability of the woods of various species of the Juglandaceæ.

California Palms. (West. Am. Scient. viii. 13).

Note on *Washingtonia filifera* and *W. robusta.*

Cercosporæ from Alabama—Some. Geo. F. Atkinson. (Elisha Mitchell Sci. Soc. viii. 34).

Twenty-eight species of *Cercospora* are described as new.

Cereus giganteus. J. D. Hooker. (Curtis' Bot. Mag. xlviii. t. 7222).

Catalogue of the Flowering Plants and Ferns growing spontaneously in the City of San Francisco. Katharine Brandegee. (Zoë, ii. 334-383).

A list of 485 species, with citations of localities, and other notes. A list of 42 species of mosses, collected mainly by Mr. H. W. Bolander, is appended.

Cleistogamy in the Genus Polygonum. Stanley Coulter. (Bot. Gaz. xvii. 91).

Climbing Prairie Rose—The. (Am. Gardening, xiii. 197).

With illustrations of *Rosa setigera.*

Contribution to the Knowledge of Nuclear Mechanics in the Sexual and Other Reproductive Cells of Plants—A. Conway MacMillan. (Bot. Gaz. xvii. 87).

Cryptomitrium tenerum (Hooker). F. Stephani. (Bot. Gaz. xvii. 58).

Cultivating the Ascosporous Forms of Yeast. J. C. Arthur. (Bot. Gaz. xvii. 92).

Evolution in Methods of Pollination. Alice Carter. (Bot. Gaz. xvii. 72, concluded from p. 46).

Erste Amerikanische Botaniker—Der. (Pharm. Rundsch. x. 94).

With illustration of John Bartram's house in Philadelphia.

Euphorbia heterophylla. (Meehan's Month. ii. 53).

Flora of Thunderhead—Notes on the. T. H. Kearney, Jr. (Agric. Sci. vi. 71).

The record of several days' collecting in the Great Smoky Range, Tennessee.

Flowers and Insects. VII. Charles Robertson. (Bot. Gaz. xvii. 65).

Fortuitous and Definite Variation. Th. Meehan. (Germantown Guide, xxi. No. 14).

Freak of a New England Orchid—The. J. T. (Gard. & For. v. 142).

Note on a white form of *Habenaria psychodes.*

Fungi, Edible—Notes on. M. C. Cooke. (Grevillea xx. 89).

These abstracts from the notes of a fungus-eating correspondent in the United States are interesting, for he has increased his list to over three hundred, including *Russula emetica, Agaricus epixanthus, A. fascicularis* and *Boletus satanas.*

Fungi—New Exotic. M. C. Cooke. (Grevillea xx 90).

Five new species from Brazil, collected by Glaziou, are described under the following names: *Polystictus nigrescens, Heliotiella stromatica, Dothidella Bambusæ, Clypeolum dissiliens* and *Metasphæria pusilla.*

Fungi—Neglected Diagnoses of. M. C. Cooke. (Grevillea xx. 81).

The following names were founded on North American specimens, principally from Carolina: *Camarops quercicola,* B. & C., *Valsaria spuria,* B. & C., *Didymella psoriella,* B. & C., *D. uberiformis,* Schw., *Didymosphæria tecomates,* B. & C., *Pyrenophora lanuginosa,* Sacc., *Sphæria rhodoglea, S. berchemiæ, S. radiella,* B. & C., *S. Curtisii,* Berk., *S. disseminata,* Schw., *S. epitephora,* B. & C., and *S. porri,* Schw. References are not given.

Golden-leaved Oak of California—The. (Gard. & For. v. 121; illustrated).

Note on *Quercus chrysolepis.*

Great Madroña of San Rafael—The. (Gard. & For. v. 146; illustrated).

A photograph of the trunk and the principal branches of the great Madroña tree from San Rafael, Marin Co., California is reproduced. It is said to be the largest of its race; has attained a height of over a hundred feet, and the trunk girts twenty-three feet at three feet from the ground.

Gongora gratulabunda. J. D. Hooker. (Curtis' Bot. Mag. xlviii. t. 7224).

Jardin Botanico y de Aclimatacion de Guadlajara—El. Mariano Bárcena. (La Naturaleza i. 441; continued).

Kansas Mosses—Enumeration of. F. Renauld and J. Cardot. (Bot. Gaz. xvii. 81).

This enumeration adds nearly forty species to those previously recorded by E. A. Rau.

Monograph of the Grasses of the United States and British America. Geo. Vasey. (Contr. U. S. Nat. Herb. ii. Part I. pp. 1-89+i-xiv. Washington, 1892).

This is the first part of a complete work on our grasses—a work that has long been earnestly desired by all botanists. The long years of study which Dr. Vasey has bestowed on these plants, and the enormous accumulation of specimens which he has brought together at the Washington Herbarium, render him the fitting person to produce it. That he will have the cordial thanks of all interested for his labor we can confidently bespeak, and that his book will be of great service in clearing away obscure points connected with grasses is altogether certain. The problems involved are of no easy order, and render the Gramineæ one of the most difficult of groups to understand. A critical knowledge of them is necessary before any of them can be well understood, and but few botanists have essayed to know them except in the most general way. The characters to be taken as primary in the delimitation of genera and species have been differently regarded by students, and the knowledge of the geographical distribution of these plants has not been sufficient to render this of much avail as a guide. The apparently great variation which nearly all the species exhibit has led to the proposal of very numerous varieties. It is probable that a close study of them in the field by a trained graminologist will be necessary before many of the questions arising can be satisfactorily solved.

But above and beyond all other problems is the question of what the older authors had on which to base their species. It is absolutely necessary that the types of these authors should be examined, in the manner that Professor Bailey went to the bottom of the *Carex* question. The classification and nomenclature of that genus rests now on firm foundation, so far, at least, as our North American species are concerned. Professor Bailey scoured Europe and America for these types, and found all but a very few of them. Dr. Gray did the same for *Asters* and *Solidagoes*, and a large number of other genera. I have tried to carry out the same process in my studies of various groups. It ought to be done for the Gramineæ.

The difficulty is that there are only two or three men in the country sufficiently conversant with the plants to make this examination of any value. We wish Dr. Vasey might see his way clear to do it himself. In the pages which lie before us the arrangement of Dr. Hackel's "True Grasses" is pretty closely followed, the tribes Maydeæ, Andropogoneæ, Boysiæ, Paniceæ, Phalarideæ and Agrostideæ being included. The following are described as new species: *Tripsacum Floridanum*, Porter (and this publication takes precedence of Dr. Porter's detailed description in the April BULLETIN, p. 130); *T. Lemmoni*, from Arizona; *Andropogon Mohrii*, from Alabama; *Eriochloa Lemmoni*, Vasey and Scribner, from the Southwest; *E. longifolia*, from Florida; *Setaria pauciseta*, from Texas and Mexico; *Phalaris Lemmoni*, from California; *Aristida Nealleyi*, from Texas; *A. palustris*, from Florida; *A. divergens*, from the Southwest; *Sporobolus auriculatus*, from Texas; *Muhlenbergia Reverchoni*, Vasey and Scribner, from Texas; *M. Emersleyi*, from Arizona; *M. Huachucana*, from California; *Agrostis densiflora*, from California; *A. Novæ-Angliæ*, from New England; *A. Rossæ*, from Wyoming; *Calamagrostis robusta*, from the Rocky Mountains; and probably a considerable number of others not indicated as new, but which from the want of citations we are unable to say whether here first proposed or not without looking through recent papers by the author and the writings of Professor Scribner.

This want of citations and synonomy is a very serious defect in the work, which we are glad to know from Dr. Vasey will be made right in a forthcoming Appendix. We have not space to note other features of this important contribution, such as the numerous reductions of proposed species to varieties, and the limits accepted for the genera. The work should be in the hands of all who wish to study these plants, and can doubtless be obtained by application to the Secretary of Agriculture.

N. L. B.

Mt. Kataadn and Its Flora. F. Lamson-Scribner. (Bot. Gaz. xvii. 46).

New Gigantic Fossils—Notice of. I. H. Barbour. (Science, xix. 99, 100; figs. 1-3).

An illustrated account of peculiar screw-like fossils found in the Bad Lands of southwestern South Dakota and northwestern Nebraska. They were given the popular name of "Devil's Corkscrews" at the time of discovery and the provisional name of *Daimonelix* is now proposed for them. They are described as gigantic coiled stems or rhizomes, sometimes extending vertically to a height of more than thirty feet and attached to a thick, rounded, obliquely inclined branch at the base. Its affinities are problematic, but one of the figures is not unlike *Spiraxis*, Newb., which has been considered by more than one observer as a fucoid stem. A. H.

New Herbarium Pest—The. H. E. Hasse. (Bot. Gaz. xvii. 99).

Notes on the Cone-Bearers of Northwest America. J. G. Lemmon. (Mining and Scientific Press, Jan. 16, 1892.)

This is in effect the same article published in Garden and Forest, v. 64, Feb. 10, 1892, noticed in the BULLETIN, last number, p. 100. The publication of the name *Pinus attenuata*, Lemmon, for *P. tuberculata*, Gordon not D. Don, is first effected in the Mining and Scientific Press, nearly a month before it appeared in Garden and Forest.

Observation on the Protection of Bud in the Tropics. Conway MacMillan. (Bot. Gaz. xvii. 54).

Ovular Structure of Casuarina suberosa. Conway MacMillan. (Bot. Gaz. xvii. 85).

Orthotrichum de l'Amerique—De quelques formes. Venturi. (Rev. Bryol. xix, 5).

This is a preliminary account of the species of this genus collected by Dr. J. Roll, in 1888, but we are sorry to see that M. Venturi is transgressing the rules of nomenclature in adopting a homonym, *O. stenocarpum*, Bridel, for one of his proposed new species. We hope he may change the name before the description is printed. E. G. B.

Outlines of Lessons in Botany for the use of Teachers, or Mothers Studying with Their Children. Jane H. Newell. (Part 11, Flower and Fruit, illustrated by H. P. Symmes, 8vo. 393, pp, Boston, 1892).

This prettily illustrated book is not only attractive but very natural and reasonable in its plan and method. The arrangement is chronologic, beginning with lessons on the familiar house-plants in March, succeeded by the wild flowers, trees, weeds and summer flowers. The drawings and studies are evidently made from nature, supplemented by abundant references to text-books and special articles, and the result will be very helpful to those in search of a pleasant guide to the study of botany.

E. G. B.

Pelexia Travassii. R. A. Rolfe. (Gardn. Chron. xi. 330).

Description of a new orchid from Brazil.

Problematic Organisms—On. Jos. F. James. (Am. Nat. xxvi. 5-10).

The author writes upon this somewhat threadbare subject, without contributing any new facts to the discussion. To those who have not had opportunity of following the controversy, however, between the upholders of the fucoid hypothesis, championed by Saporta, and the animal or inorganic hypothesis, as set forth by Nathorst, this article may be of interest. The author claims that the remains of algæ are seldom preserved, and that the vast numbers of markings in the older rocks, many of which have been referred to algæ, are more probably due to tracks, trails and inorganic markings.

The substance of this article was read before Sec. E. of the A. A. A. S., at the Washington meeting.

A. H.

Pyrus Ioensis. L. H. Bailey. (Bot. Gaz. xvii. 60).

A plea for *P. Ioensis* as distinct from *P. coronaria.*

Romneya Coulteri. (West Am. Scient. viii. 5, illustrated.)

Rubus Millspaughii—A New Edible Blackberry. L. H. Bailey. (Agric. Sci. vi. 66).

R. Millspaughii is reported as having been collected in North Carolina, in New Hampshire and in northern Michigan, and therefore a much more widely spread species than was at first supposed.

The Fairyland of Flowers: A Popular Illustrated Botany. Mara L. Pratt. (3rd Ed. 4to pp. 219; profusely illustrated. Educational Publishing Co., Boston).

Our attention has recently been called to a work with the above title, which, the introduction states, is designed to replace the confusing "Manuals" and "Floras" so that "with a little guidance from the teacher, the child *can* trace a flower from its great 'class' down to the particular number of the particular family to which it belongs." We always heartily welcome all good works whose aims are to simplify and popularize the study of botany, but this is one in which the attempt in these directions has apparently blinded author, publisher and public alike, causing the former to sacrifice many of the plainest and best known facts, and the latter to overlook or ignore the most self-evident blunders. How the book could have reached a third edition in its present shape without attracting attention or inciting protest and ridicule is a mystery. From end to end blunders and errors are met with, and an attempt to enumerate them all would be bewildering. We note a few by way of example.

Page 23, the definition of whorled is "Round the entire stem, almost like the petals of a corolla," and by way of illustration are two figures, one representing connate leaves, the other a perfoliate leaf.

Page 118 has a figure denominated "branch of alder." It is manifestly nothing related to *Alnus* but it is a very good representation of *Populus*.

Page 126 contains a figure with the legend "pepper of Valerian." This was evidently no misprint, as it also occurs in the text. We presume "pepper" must be the popular name for seed or fruit.

Page 134 is occupied by three figures. Two of them are sufficiently accurate for us to recognize the fact that *Aster* sp. rests easily as "May Weed." *Anthemis* is equally contented as "Wild Aster (white)."

Page 142 is ornamented with a cut of a thistle leaf labeled "Leaf of Holly."

Page 167 has a figure of a *Galium* as illustrative of "Milkweed." We suppose this must mean *Asclepias*, as we are told that it is allied to the dogbane. We are warned, however, that they are too hard to analyze and that we "had better just now be content to look at them."

Page 172 has a cut of some *Papaver*, evidently taken from a florist's catalogue, which is used to illustrate *Anemone.* The error was possibly the florist's originally, and the poor author knew no better than to perpetuate it.

Page 173 is striking by a wonderful composite picture of a *Claytonia* and an *Hepatica*, springing from one root. It is labeled *Hepatica.*

Page 174 contains another combination consisting of two *Sedums* and a spike of some totally different flowers (upside down), the combination being called "Larkspur."

The evils resulting from trying to use common names only in describing plants are glaringly demonstrated throughout and many of the most absurd errors may be attributed to this source. Thus the author has doubtless heard *Aralia* called "ground nut," so when he wishes to illustrate the "Ginseng Family" a figure of *Apios* is used, because that also is known as "ground nut." Again on page 152 there is a picture of a *Eupatorium perfoliatum*, which is labeled "Comfrey," probably because they are both known under the name of "Thoroughwort."

We extend our heartiest sympathies to all who have derived their knowledge of botany from this source, as we are hardly yet prepared to admit that Gray's Manual could be more puzzling than the attempt to reconcile a description of *Asclepias* with a figure of *Galium*, or a determination to see *Anemone* in *Papaver.*

We have noted a few of the worst absurdities; there are many more.

A. H.

Scolithus—The Genus. Jos. F. James. (Bull. Geol. Soc. Am. iii. 32-44; figs. 1-15).

The author has here collected together most of the references to the problematic organisms described from time to time under the genus *Scolithus.* They have been variously referred to Algæ under the name of *Fucoides* and *Eophyton*, to worm borings under *Scolithus* (*Skolithos* originally) and *Arenicolites* and even to the sponges. The paper is a useful compilation of the diverse views held by various authorities upon the subject.

A. H.

Seed Coats of Malvaceæ—The. P. H. Rolfs. (Bot. Gaz. xvii. 33, with plate).

Serotinous Pines. Geo. B. Sudworth. (Gard. and For. v. 160, illustrated).

Notes on *Pinus clausa,* its geographical distribution and synonymy.

Some Curious Catnip Leaves. Mrs. W. A. Kellerman. (Science xix. 66, 67, illustrated).

The writer's observations are strikingly remindful of Grant Allen and appeal equally to the faculty of observation and imagination.

Talauma macrocarpa, Zucc. (El Estudio, iv, 133, 1891).

The Economical Tree. T. S. Hopkins. (Evening News, Thomasville, Ga. i. No. 48).

In this case it is an old *Morus alba* that sends out adventitious roots from the summit of its hollow trunk, which, reaching the earth, have enabled the tree to survive uprooting and amputation of its limbs.

The Tannins. Henry Trimble, Ph. M., Professor of Analytical Chemistry in the Philadelphia College of Pharmacy. (Vol. 1, 8vo. 168 pp., Philadelphia, 1892).

Monograph on the history, preparation, proprieties, methods of estimation and uses of the vegetable astringents, with an index to the literature of the subject.

Trillium erectum. (Meehan's Month. ii. 49, illustrated).

Trilliums—The. L. Greenlee. (Am. Gardening xiii. 206, illustrated).

Ueber Einige Brasilianische Algen. M. Möbius. (Ber. Deutsch. Bot. Gesellsch. x. 17, illustrated).

Ulota Americana, Mitten. F. Venturi. (Revue Bryol. xix. 2, 1892).

This is a long and interesting discussion on the specific value of Mitten's species as compared with its allied species which M. Venturi considers to be *U. Hutchinsiæ* rather than *U. crispa* and *U. crispula* with which Mitten compared it. He also criticises S. O. Lindberg very severely for taking up *Ulota Americana* of Palisot de Beauvois (1805), for *U. Hutchinsiæ,* Hammar (1852), stating that the type of the former is unknown, and it is impossible to determine whether it was *U. Americana*, Mitten or *U. Hutchinsiæ*, Hammar. He condemns Braithwaite and Limpricht for following Lindberg in the "deplorable exhumation" and accuses the latter of reducing *U. Americana*, Mitten, to a synonymn of *U. Americana*, Beauv., without seeing the specimens. Now according to the rules of nomenclature there need be no confusion in the matter, for if *U. Americana*, Beauv. is lost, and its value cannot be determined, then let *U. Hutchinsiæ* stand, as it has, for the common European and American species, but do not take up the same name given by Mitten (1865), to another specimen; rather let Mitten re-christen his species and revise his opinion on its alliance. I have sent a portion of the same plants sent to Venturi to Mitten and await his verdict. I think the plants in question are *U. curvifolia*, (Wahl.).

E. G. B.

Vitality of Ferns. Theo. Holm. (Bot. Gaz. xvii. 56).

Proceedings of the Club.

MEETING OF APRIL 12TH, 1892.

The President in the Chair, and fifty-six persons present.

Miss M. L. Taylor, Mrs. Elizabeth H. Kellogg and Mr. Appleton P. Lyon were elected active members.

Dr. J. W. Barstow, of Flushing, Long Island, long an active member, was elected a corresponding member.

Dr. C. F. Millspaugh sent for exhibition a living specimen of *Carex Fraseri*, collected by Mr. L. W. Nuttall in southern West Virginia. This adds another to the few known localities of this interesting plant. Mr. Nuttall reports it as abundant, but subject to the depredations of some animal which eats the heads off before the fruit is mature.

Professor Edward H. Day delivered the announced paper of the evening on "Fern Gathering in Jamaica." The paper was copiously illustrated by lantern views and herbarium specimens.

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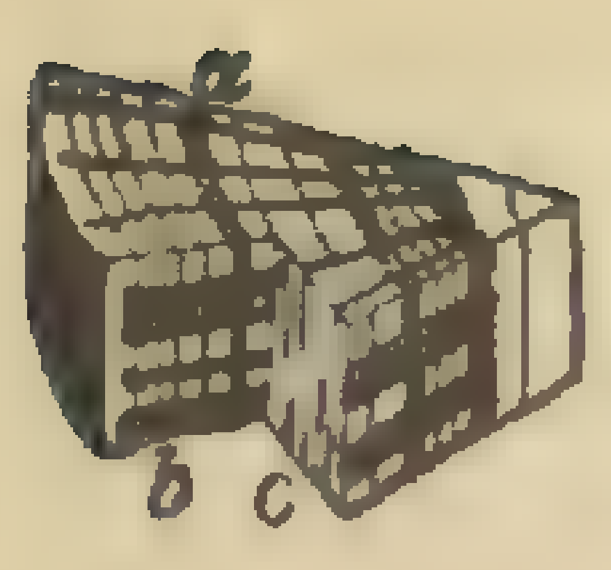

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VOL. XIX. JUNE, 1892. No. 6.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

A MONTHLY JOURNAL OF BOTANY.

EDITED BY

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.

The Genus *Frankia* in the United States: *Geo. F. Atkinson* (Plate CXXVIII)...... 171

Impressions of Alaska: *Grace E. Cooley*.. 178

Leucobryum minus, Hampe: *Elizabeth G. Britton*.................................. 189

The Flora of a Montana Pond: *R. S. Williams*.................................. 192

BOTANICAL NOTES.—*Sphagna* from North Carolina: *J. K. Small*; The Host-Plant of *Aphyllon Ludovicianum*: *Jacob Schneck* 195

RECENT AMERICAN BOTANICAL LITERATURE.—Botany of the Washington Zoological Park; Descriptions of New Plants from Southern California, Utah, Nevada and Arizona; Flora Franciscana, Part III; Fossil Plants from the **Wichita or Permian Beds of Texas**; New Species of Fungi; Hand-Book of West American Cone-Bearers; Hepaticæ of the Hawaiian Islands; Primitiæ Floræ Costaricensis; The North American Pyrenomycetes; and briefer notices.................................. 195

PROCEEDINGS OF THE CLUB................ 201

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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XIX.] New York, June 4, 1892. [No. 6.

The Genus Frankia in the United States.

By Geo. F. Atkinson.

(Plate CXXVIII).

At the Indianapolis meeting of the A. A. A. S. in 1890, Dr. W. J. Beal exhibited before the Botanical Club specimens of root-galls on *Ceanothus Americanus*.* Knowing of my interest in the subject of root-galls he left the specimens with me for determination. The galls resembled so closely in external appearance those of the tubercles of some of the Leguminosæ that I half suspected they were caused by a similar organism. On examining a section, however, it was at once apparent that the analogy was entirely superficial. In the parenchymatous tissue surrounding the central cylinder were numerous enlarged cells occupied by what appeared to be plasmodia, bearing a striking resemblance to those of *Plasmodiophora Brassicæ*, Wor.†

Fearing that the real nature of the organism might be disguised by the influence of the alcohol in which the specimens were preserved, I sent to Dr. Beal for fresh material. From this material the true condition of affairs was at once presented. The organism is closely allied to that producing the galls on the roots of various species of *Alnus* and the Elæagnaceæ, which has been long known in Europe, and was first described by Woronin as *Schinzia Alni*.‡ This fact, and also that the fungus has more recently served as the basis of Brunchorst's new genus *Frankia*,[*] I reported to the Botanical Club at the Washington meeting of the A. A. A. S., 1891.[†]

---

* Botanical Gazette, Vol. XV., No. 9, p. 232.

† Pringsheim's Jahrbücher, Bd. XI., 1877.

‡ Ueber die bei der Schwarzerle und der gewöhnlichen Garten-Lupine auftretenden Wurzelanschwellungen, Memoires d. l'Acad. Imp. d. Sciences, VIIe Series, Tome X., No. 6. p. 2, 1866.

During the month of December following I took occasion on one of my collecting trips to examine the roots of *Alnus serrulata*, believing for more than a year that quite likely the fungus was as common here as in Europe. This I found to be the case, and I have since collected some very fine specimens. The next step was to examine the roots of *Ceanothus Americanus* in this vicinity, and sure enough the galls are common to Alabama as well as to Michigan, and I have no doubt that a rich harvest has for years been awaiting the root-gall fungus hunter in all parts of America.

On *Ceanothus Americanus* the galls when young are flesh colored, cylindrical, and from 1-2 mm. in diameter, by 2-6 mm. in length. They originate as minute lateral abnormal growths from young roots, or in many cases from the side of the large tap root. In successive years they continue their growth by a dichotomous or trichotomous branching, each year's growth remaining from 1-2 mm. in diameter and 4-6 mm. in length. After several years there is developed a loosely branched dendroid body. The older portions of the gall become dark or nearly black in color, while the new year's growth is flesh color.

The galls on *Alnus serrulata* differ in form as a whole, while the manner of growth is quite similar. The individual yearly growth is more restricted, so that a rotund or irregularly oval more or less compact mass with a botryose appearance is developed. The gall of the first year is 2-3 mm. long by 1-2 mm. in diameter. By successive di- or tri-chotomies the mass is formed from the size of a pea to that of a small walnut. In some species of *Alnus* the gall reaches the size of one's fist.[‡] In the larger galls on the *Alnus* the original dichotomous branching is lost sight of in the compact growth, and is only plainly visible in the surface.

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[*] Ueber einige Wurzelanschwellungen, besonders diejenigen von *Alnus* und den Elæagnaceen, Unters. Bot. Inst. Tübingen, Zweiter Band, p. 151. u. folg.

[†] Botanical Gazette, Vol. XVI., No. 9, p. 262.

[‡] Woronin, Mem. de l'Acad. Imp. des Sciences; Sorauer, Pflanzenkrankheiten, Zweite Auflage, Erster Band, p. 747. Brunchorst, Unters. Bot. Inst. Tübingen; Frank, Krankheiten der Pflanzen, and others.

The internal structure of the gall differs but little in the relation of the different tissue systems from that of the normal root. The central cylinder is present surrounded by an abnormally great development of parenchymatous tissue, which is surrounded by the corky layer. The parenchymatous tissue harbors the parasite.

In *Ceanothus Americanus* there is a narrow zone of parenchymatous cells, immediately surrounding the central cylinder, usually free from the parasite and made up of nearly isodiametric cells. Bordering this is a broad zone of parenchymatous tissue of large cells quite variable in size and shape. The cells containing the parasite are usually considerably larger than the others. Frequently all the cells of this zone viewed in cross section are elongated radially. In *Alnus serrulata* the cells containing the fungus are but little if any larger than the other parenchymatous cells, and the radial elongation of the cells is rarely observed. The observation and determination of the fungus is not so easy as in the galls on *Ceanothus Americanus*, because of other substances which obscure it.

The fungus when mature forms compact botryoid clusters in the affected parenchymatous cells of the gall, the central portion being composed of a complexly-branched mass of threads bearing at their ends on the periphery of the mass the globose sporangia.

A brief résumé of the leading views concerning these galls from a historical standpoint will be of interest in connection with a description of the fungus.

Meyen* considered them to be parasites growing upon the roots of *Alnus*, having a habit in this respect similar to members of the Balanophoraceæ or Orobanchaceæ, though lower in development and systematic position.

Schacht † at first regarded them as normal growths of the roots. Later ‡ he held the view that they were abnormal growths, but offered no theory as to their cause.

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* Ueber das Hervorwachsen parasitischer Gewächse, etc., Flora, 1829, S. 49. Quoted from Woronin, Mem. d. l'Acad. Imp. d. Sciences VIIe, Tome X., No. 6, p. 2.

† Flora, 1853, S. 10, 11. Quoted from Wor. l. c.

‡ Der Baum, 1860, S. 172-174. Quoted from Wor.

Jäger[*] thought they were of insect origin.

Woronin[†] considered the fungus to be closely related to Nägeli's genus *Schinzia*. This genus was founded upon a fungus which pierced the root rind of various species of *Iris*, and produced flask-shaped bodies at the ends of the threads in the cells[‡].

Magnus considered it too different from *Schinzia cellulicola* to be placed in the same genus.[§]

An article by A. Gravis [||] entitled, "Observatione anatomiques sur les excroissances des racines de l'aune" induced Woronin to make additional researches upon young galls of *Alnus.* The condition of the organism he found here bore such a resemblance to his *Plasmodiophora Brassicæ*[*] that he communicated to Gravis his belief that two organisms were frequently present, one a *Plasmodiophora* like Myxomycete, and the other a filamentous fungus. Gravis communicated this in "Note sur les excroissances des racines de l'aune.[†]"

E. Warming[‡] notes the presence of galls on *Hippophoe*, *Elæagnus* and *Shepherdia* which resemble those on *Alnus*, and records the discovery of what he considers a parasitic Myxomycete of like nature with Woronin's *Plasmodiophora.*

H. Möller[§] in his earlier studies of these galls used only alcoholic material, and probably for this reason overlooked the real nature of the fungus. He claimed to have demonstrated its affinity with *Plasmodiophora* and named it *Plasmodiophora Alni.* Woronin * then reviews Möller's article and states that it yet remains to be shown whether this *Plasmodiophora*-like parasite is the sole cause of the root galls, or whether, perhaps, as he already had suggested † it was accompanied by a filamentous fungus.

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[*] Ueber eine krankhafte Veränderung der Blüthen Organe der Weintraube, Flora, 1860, S. 49. Quoted from Woronin.

[†] Mem. d. l'Acad. Imp. d. Sciences, VIIe, Tome X., No. 6, 1866, St. Petersburg.

[‡] Flora, 1842, p. 278. See Sorauer, Pflanzenkrankheiten, Bd. I., p. 748.

[§] Sitzungsberichte des bot. Ver. d. Prov. Brandenburg XXI., June 27, 1879. Quoted in Sorauer, Pflanzenkrankheiten, Bd. I., p. 748.

[||] Bulletin de la Société royale de Botanique de Belgique, Tome XVIII., 1re partie, p. 50-60. See Berichte der Deutschen Botanischen Gesellschaft, Bd. III., 1885, p. 177.

[*] Pringsheim's Jahrbücher Bd. XI., 1877.

[†] Compte rendu de la séance mensuelle du Jan. 10, 1880, de la Société royale de botanique Belgique. See Berichte der Deutschen Botanischen Gesellschaft Bd. III. 1885, p. 177.

[‡] Smaa biologiske ogmorfologiske Bidrag. Botanisk Tidsskrift, 3dei Räkke, Bd. I,, 1876, p. 84. Reference "Wurzelknöllchen bei den Elæagneen, Just's Jahresbericht, 1876, p. 439.

[§] *Plasmodiophora Alni*, Berichte der Deutschen Botanischen Gessellschaft, Bd. III, 1885, p, 102-105.

Brunchorst,‡ by his excellent investigations, gets the key to the true nature of the parasite and thus fairly sets in order a subject hitherto clouded in great confusion. The fungus is shown to be a filamentous one and what Woronin § and Möller‖ took to be spores are in reality sporangia, which by successive oblique divisions of the protoplasmic contents form spores.

The plasmodia of various authors is the cell plasma of the host with the very fine fungus threads imbedded in it and so obscured that they cannot be seen except by the use of certain reagents. Thus with the use of a hot solution of "Salzsäure" in galls from *Alnus glutinosa,* a delicate filamentous structure, reminding one of a skein of matted threads, is made visible.

In longitudinal sections of a gall, he calls attention to three rather ill-defined zones, representing different stages of development of the parasite. Just behind the root-cap is the first zone, bearing the younger stages of the fungus, where in fresh untreated preparations it resembles plasmodia. Next comes the sporangium zone, where the hyphæ can be seen quite well, bearing on their ends at the outer surface of the hypha-skein the sporangia. In the third zone the contents of the sporangia are either undergoing division into spores, or are empty.

The likeness of the fungus in the younger zone to plasmodia is heightened by the fact that the threads which emerge from the mass and pass through the cell walls to other cells, give the appearance of very delicate pseudopodia.

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* Berichte der Deutschen Botanischen Gesellschaft, Bd. III., 1885, p. 177, 178.

† Compte rendu de la séance mensuelle du 10 Jan., 1880, de la Société royale de botanique Belgique. See also Revue Mycologique, Tome II., 1880, p. 69, 70, and Bot. Centralblatt, 1880, p. 354.

‡ Ueber die Knollchen an den Wurzeln von Alnus und den Elæagnaceen. Bot. Centralblatt, xxiv. p. 222, 1885.

Ueber einige Wurzelanschwellungen, besonders diejenigen von Alnus und den Elæagnaceen. Unters. Bot. Inst. Tübingen, Zweite Band, p. 151, 1886. See also Bot. Centralb. Bd. xxviii, p. 109, 1886.

§ Mem. Acad. Imp. Sci., etc.

‖ Bericht., Deut., Bot. Gess.

Ward[*] says that the fungus of the tubercles of the roots of Leguminous plants stimulates the protoplasm of the tubercles, so that it resembles plasmodia. It is possible that some such influence is exerted on the protoplasm of the galls of *Alnus*, etc.

Woronin,[†] Frank,[‡] Sorauer[§] represented several sporangia on a single thread. Brunchorst (l. c.) shows that this appearance is an optical illusion, sporangia frequently lying over threads appear as if united with them.

Möller[‖] observed the hyphæ in the sporangium zone, but regarded them as remnants of the plasmodium, which did not go to form spores and which remained in connection with the spores as they were differentiated from the mass. Brunchorst calls attention to the fact that if this were so they would not be so constant in outline and diameter.

Brunchrost properly regards the fungus as distinct from *Schinzia*, and takes it as the type of a new genus which he calls *Frankia*. Unfortunately he does not accept the well-known specific name *Alni*, but calls it *Frankia subtilis*. While there are variations in the size of the sporangia from different hosts, he does not consider them sufficient to be of specific value.

Thus in *Alnus undulata* they vary from 4μ-6μ; in *Hippophoë rhamnoides* from 2μ-3.5μ; and in *Alnus glutinosa* from 3μ-5μ.

B. Frank[*] rejects the theory that they are abnormal growths due to a parasitic fungus, but regards them as normal organs for the transitory storage of proteid bodies.

Möller,[†] in 1890, reinvestigated the galls, using fresh material instead of alcoholic material, and corroborates Bunchorst's view that the organism is a filamentous fungus, but differs from him in some minor details. Brunchorst thought the hyphæ were septate, but Möller claims that they are continuous.

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[*] Phil. Trans. Vol. 178, p. 547.

[†] Mem. d. l'Acad. Imp. d. Sci. VIIe. T. X. 6, 1866.

[‡] Krankheiten der Pflanzen, 647. .

[§] Pflanzenkrankheiten, Bd. I.

[‖] Ber. d. Deutsch. bot. Gesellschaft Bd. III. 1885, p. 102.

[*] Sind die Wurzelanschwellungen der Erlen und Elæagnaceen Pilzgallen? Ber. d. deutschen Bot. Gesellschaft, Bd. V. Heft. 2. Reference in Bot. Centralblatt. Bd. XXV. p. 366.

[†] Beitrag zur Kenntniss der *Frankia subtilis* Brunchrost, Ber. d. Deutsch bot. Gesellschaft Bd. VIII., 1890, p. 215-224. See Centralblatt für Bakteriologie und Parasitenkunde Bd. VIII,, 1890, p. 559-560 and Bot. Centralb. 1891, p. 60.

He also notes the much stouter mycelium and the irregular sporangia in the galls of *Myrica Gale*, and considers it a distinct species for which he proposes the name *Frankia Brunchorstii.*

It appears to me that the fungus in the galls of *Ceanothus Americanus* is a distinct species from the other forms, and I propose the name *Frankia Ceanothi* for it.

In addition to the characters given above are the following: The infected cells are 30-50x50-70μ. The sporangia are smaller than in any described species, varying from 1.5-2μ.

It is worthy of remark, probably these organisms have a very wide and complete distribution, so that the galls are probably found wherever the hosts grow. In this respect they are analogous to the organisms which produce the tubercles on the roots of the Leguminosæ. The question would then naturally arise whether there is a symbiotic relationship between parasite and host, for so far as can be seen they cause no inconvenience to their host. I am not aware that this matter has been tested. The contents of the sporangia of *Frankia*, like the "bakteroids" of the tubercles, have a proteid nature* and color yellow with Jod, red with Millon's reagent, and are tinged easily with hæmatoxylin and aniline colors as eosin and methylviolet.

I would be pleased to receive these root galls on any plants, from any parties who would be kind enough to look for them on any shrubs. The host plant should in all cases be given and the roots well wrapped in peat moss or other damp packing material to keep them fresh.

EXPLANATION OF PLATE CXXVIII.

Fig. 1.—*Frankia Alni* (Wor.), root galls on *Alnus serrulata.*

Fig. 2.—*Frankia Ceanothi*, Atkinson. root galls on *Ceanothus Americanus.*

Fig. 3.—Same, group of parenchymatous cells showing two containing fungus.

Fig. 4—Same, showing cluster of sporangia more highly magnified. The cluster has been removed from the cell.

Phytopathological Laboratory, Alabama Polytechnic Institute,
Auburn, Ala., April 14, 1892.

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* Brunchorst, Unters. Bot. Inst. Tubingin. 1886. B. Frank, Bericht. d. Deutsch. Bot. Ges. V. 2.

Impressions of Alaska.

By Grace E. Cooley.

A short trip of five weeks to southeastern Alaska must give only the merest impression of its beauties and resources, yet the mind is crowded full of memories of pleasant days, beautiful pictures and interesting questions about our "new Eldorado." This name has been justly given to Alaska, for its quartz ledges have been "prospected" by the gold-seeker from Fort Tongas to the Yukon, and to him the country is best known—even the Government exploring parties to the interior still following his trail. The rest of the world, held in check by the instant barriers to intrusion presented by the Coast range, skirt the shore and scarcely touch foot a mile from the sea; while the greater mass of travelers who "go to Alaska" sleep, eat and live on the steamer from Puget's Sound to Sitka and back to the starting-point. Hence we gain, at best, only a slight conception of this vast country, with its miles of unexplored mountains and plains, though the imagination is fired and the impression is vivid and lasting.

To the tourist, a trip to Alaska means ocean travel, with all of its delights and none of its disagreeable features. It means two thousand miles of panoramic scenery, as if Norway with its fiords and Switzerland with its glaciers and white peaks could be unrolled as a scroll and viewed from a steamer's deck. There are to be seen dome-like peaks, snow-capped like Ranier and Baker, sharp-pointed and glacier-bearing like Fairweather and Crillon. Here also are inlets and channels, deep and narrow, between high, rocky walls, with the Cascades on the east bathing their feet in the Pacific waters, and the mountain-tops of a submerged range closing the western view.

From Puget's Sound north for a thousand miles to 60°, to where the coast line turns to run directly west, the map shows a long series of passage-ways between a ragged coast and the fringe of out-lying islands, these last being only parts of the mountain-chain that dips into the sea from that lower portion in Washington which we call the Olympics. So deep are some of these passages that no anchorage is afforded, and so narrow that one well-remembered night, being caught by a sudden fog, we steered by the echo of the ship's whistle from the cliffs on either side. Sometimes, without a foothold of beach, the steep slopes run up one thousand to three thousand feet, clothed to the top with evergreens and musical with waterfalls.

To the geologist this coast presents many interesting features, for forces of ice and water are still active and the mountains are of quite recent formation, so that many of the sharp peaks are still unworn by mountain torrents.

The artist sees gorgeous coloring, almost tropical luxuriance of verdure, beautiful head-lands, wonderful vistas, and has mountain, valley, cascade, and a strange, picturesque people as subjects of study.

The botanist is enough of a poet to share in the feelings of artist, geologist and tourist, though he may not in those of the gold-seeker, and to him it is a new world of tantalizing mysteries. It comes so close to Kamschatka, that strange land, still wrapped in the weird twilight, through which, as imaginative school-children, we viewed its long, queer peninsula. Anything specifically "Kamschatkensis" would be strange indeed, and no doubt stray waifs from there are lurking in these forest shades or above them on the mountain tops. Perhaps, too, one may get here a glimpse of Japanese or Chinese flowers, for we are told of that Japan current, that tradition says brought the Klingets to these shores.

Furthermore, we are speeding toward the place where flowers have a day of twenty-four hours in which to deepen and strengthen their color and perfume, and Alpine and Arctic plants will always be loved by the botanist. So, while the tourist is enjoying a half-doze over his panorama from the steamer-chair, you are longing for a closer view of the plants that clothe the banks. You are wise, then, if you have taken a freight steamer, that can give you, while doing its own business at the canneries, from four to thirty-six hours on shore every day or two of the three weeks in which the trip is made.

At Loring, fairly down on the Alaskan coast, the shore is typical of what is to be seen for hundreds of miles farther north. A narrow trail runs along a tiny strip of beach to an Indian *rancherie* of a score of houses, all facing the shore and backed against the rising ground of the mountain-side. Here it is a look straight up into the air to reach the sky-line, and the mountain is heavily wooded with evergreens.

Hemlock is abundant and beautiful, the branches of the *Tsuga Mertensiana* being more graceful than those of our eastern one, having a little the effect of a drooping Norway spruce, though of course the tree is of magnificent size and different proportions.

The Menzies spruce is the most common tree here, and in all the parts of Alaska that I visited, and is said to constitute nine-tenths of the coast forest. It is called the "Sitka Pine," and is cut for lumber in the settlements about Juneau. Its shape is like the fir of our Maine coast, presenting the same slender spires in the profile of an horizon line, but it stands one hundred and fifty or two hundred feet high, and measures six feet or more in diameter. Another evergreen, less common, is *Tsuga excelsa*, the yellow cedar or yellow cypress.

This forest forms the northern part of the most magnificent reach in the world, that which runs through British Columbia to Washington and Oregon, where the trees—influenced by the same conditions of warmth and humidity which operate here, but with shorter winters—reach their grandest proportions.

Taking a trail through the woods, we climb over logs by means of steps cut into the trunks; walk over logs or stumble over loose rocks, always under the cover of thick boughs, draped and festooned with mosses and lichens.

The commonest mosses are golden green *Hypnums*, as *Hypnum loreum* and *triquetrum*, or the pale and matted *H. undulatum;* these, with such lichens as *Sticta Oregana, Usnea barbata, Alectoria ochroleuca*, vars. *sarmentosa* and *Fremontii*, swathe the branches with thick bands and render them graceful with delicate grey and black draperies. After a rain, when a tardily-setting sun throws its horizontal rays into these dark coverts, they are brilliant with gorgeous coloring.

Our path is stopped at last by a wall of rock, over which tumbles a cascade, half-hidden by the mosses and maidenhair ferns that the rocks carry. A step down from the fallen tree on which we are walking takes us into the deep moss carpet that everywhere covers the ground. Here are *Hypnum splendens*, *Climacium Ruthenicum*, *Mnium punctatum* for the taller forms, and multitudes more. Meanwhile the eye is delighting itself in ferns, herbs and shrubs of all kinds. Here are Aspidiums and Phegopteris disputing with the mosses for foothold; *Maianthemum bifolium*, under var. *dilatatum; Clintonia uniflora*, with its one blue berry; *Cornus Canadensis;* and *Streptopus amplexifolius*, brightening with its half-ripe fruit the deep greens of the background.

And berry-bushes untold! One has said of Alaska, that God must have made this country with special forethought, for his creatures can live here without considering the question of "what shall we eat and what shall we drink,"—the berries, fish and fowl leave man nothing to labor for. We found strawberries, salmonberries, two species of trailing *Rubus*, *stellatus* and *pedatus;* high blackberries, low blackberries, a raspberry, and four species of gooseberries and currants, all edible; *Sambucus racemosa*, of which the Indians are fond; *Viburnum pauciflorum; Vaccinium Myrtillus* and *ovalifolium;* the red blueberry, *parvifolium;* the Salal, so highly valued; a pleasant small cranberry and *Vaccinium Vitis-Idæa*, almost as good—enough for man and beast—Klinget and bear and duck.

I gathered nineteen of the twenty edible berries which a Chilcat missionary told me are to be found. Of these the salmonberry, gathered in the summer and preserved for winter use in salmon oil, is most valued. It is a large salmon-colored or orange raspberry, very delicious when picked and eaten fresh from the bushes, though disappointing if bought from the Indians on the wharf, where the aroma of oil that pervades everything Klinget clings to them.

Juneau is a mining town, and is the largest in Alaska. It lies about 58° north latitude, and is overhung by a mountain three thousand five hundred feet high; fronts a long range on Douglas Island, while back of the town peak rises beyond peak. Here we made a stop of fifteen days, hospitably entertained by some sweet French sisters of the St. Ann's Mission, who have a school and miners' hospital here. I find an old map has "perpetual rain" written across the country at this place, but fortunately we had as many bright days for collecting as we could use, for so saturated is the atmosphere that we were forced to resort to the laborious process of stove heat to dry our papers. Very few of our plants moulded, however, due to our care and to the precaution of poisoning our blotters before we left Seattle. Juneau has a reputation for more rain than Chilcat or Sitka, and a botanist friend speaks with enthusiasm of the clear, dry air he experienced in a short trip of thirteen days up the coast.

A delightful excursion from here is up Gold Creek Cañon for four miles and a half to Silver Bow Basin, a high level tract of a mile in width, completely shut in by mountains. In following Gold Creek up through the cañon we make a rise of two thousand feet, and for the whole distance we are charmed with the scenery, for the stream winds in among the mountains in such fashion as to open continually new vistas with other snowy summits. Here are alders and willows, with blackberry bushes for the undergrowth, the *Picea Sitchensis* raising its fair straight trunks above them. Ferns are abundant: *Aspidium spinulosum*, *Polypodium vulgare*, with other old friends, *Adiantum pedatum*, *Cysopteris fragilis* and the Beech ferns, *Phegopteris Dryopteris* and *polypodioides*. *Pteris aquilina* is here too, but is three, four or five feet high, and its downy fronds show it to be the var. *lanuginosa*. All the ferns are tall, but are familiar forms, the *Cryptogramme acrostichoides* being an exception to this rule. This is to be found covering the barren rocks of a landslide or the debris left from the miners' blasts. *Aquilegia formosa*, *Aconitum*, *Campanula*, *Circæa*, *Galium* and *Saxifraga* are found in profusion.

The *Asters* are of the division with narrow linear leaves, dark green in color, the heads being large, deep violet, with loosely imbricated involucres.

Geranium erianthum, the western form of our *maculatum*, differs little from it except in color and texture, but its pure blue blossoms are much more lovely. The *Saxifragas* are omnipresent in many plumy graceful shapes, and the *Streptopus* is another plant always to be met with. Mosses clothe every place left untrimmed with flowers.

Reaching the basin, we come to the largest placer gold-mine in the world, worked by mountain streams brought to bear upon the disintegrated rock by means of immense hydraulic rams, the water with its charge of gold-dust and gravel being sent through a tunnel three thousand feet long, where quicksilver catches the gold.

Here are sphagnum swamps encircled by alders and willows, and whitened with *Eriophorums* like our bogs at home in New England.

Potentilla palustris, which we find here, is an old friend, too, but the snowy slopes that wall us in remind us that we are in Alaska. These slopes are rich in brilliant flowering plants, particularly alpine and sub-alpine.

As we ascend along the snowy gorge, we meet above the tree-line and the salmonberry bushes a tangle of *Heracleum lanatum*, *Aquilegia formosa*, *Aconitum*, *Veratrum*, *Senecio*, *Valeriana*, *Geranium* and *Spiræa* Then the flowers show broad belts of color: here are the rose purple and white *Epilobium latifolium;* golden *Geums* and *Ranunculus;* blue *Violas;* pink *Pyrola minor;* white *Polygonum viriparum;* white *Eriogynia pectinata* with its beautiful feathery vines; heath like plants, as *Cassiope,* in pink and white; *Bryanthus glanduliflorus*, yellow-green; *Silene acaulis*, showing a rich spread of pink; *Hieracium triste*, with black woolly involucres; *Anemone Richardsoni*, delicate yellow; white *A. narcissiflora*, and *parviflora* veined with purple. There were *Arnicas*, too, and representatives of *Saxifraga*, *Parnassia*, *Tofieldia*, *Gentiana*, *Pedicularis*, *Astragalus*, *Oxytropis*, *Habenaria*, *Stellaria*, and *Cerastium*, alpine *Salices* in full bloom, and many more, covering the steep mountain-side, where the loose rocks would seem to leave no chance for even a plant to find foothold. From the top the slope presents a gorgeous stretch of color long to be remembered!

In going to a new region the relative importance of certain genera hardly noticed at home comes out sharply.

The *Saxifrages* are here a dominating group, both as to abundance and variety.

The *Tiarella trifoliata* is graceful and delicate; *Mitella pentandra* and *Telima grandiflora* are sturdy, rough-leaved plants; *Boykinia major* is a plumy species, and covers the rocks with its white sprays. Over the bare landslides spread *Saxifraga leucanthemifolia* and *S. punctata;* and *S. bronchialis*, and *S oppo-*

sitifolia creep over other barren places, the latter a most curious plant with sharply ciliated leaves, which are curiously punctured at the top, as if with a conductor's punch.

Even the Hydrophyllaceous plant *Romanzoffia Sitchensis* takes on the characters of the *Saxifrages* so that it deceived the very elect, and was at first put in the family with them.

Up and down the shore from Juneau are cañons, cut by the cold mountain streams, and to these we went for botanical specimens, learning to know the ill-traits of that pest of the prospector, the Devil's Club.

Climbing over a slippery tree-trunk covered with moss is not an easy task, and there stands always at hand this instrument of Satan, which you instinctively grasp to your sorrow, for the spines find means to punish you. You slip, perhaps, off this same log that is helping you over a bog of deep, moist mosses, and the declined stem of the plant sinks with you and acts as a lever to hit you in the face with the thickened end of the stem. It deserves its grotesque name of *Fatsia horrida*, yet it adds much to the beauty of the forest, with its thick, vine-like foliage, particularly in the fall, when, I am told, the leaves take on a soft yet brilliant orange-yellow color, giving to the otherwise sombre, evergreen shades an autumnal richness.

At Salmon Creek, where we saw the beautiful fish for which it is named, attempt to scale the fall of fifteen feet, we found the Siberian Lily, rich orange with dark brown markings; had our first experience of exploring a forest with no trail, and found the *Mertensia maritima* on the beach, that four years ago I found at Mt. Desert, Me. *Lysichiton Kamschatkensis* takes the place of our *Symplocarpus fœtidus* in the swamp; and *Mimulus luteus*, *Claytonia Sibirica*, *Epilobium luteum* and *Impatiens fulva* border the brooks, which are too cold to support life themselves, being glacier or snow-fed all summer.

South of Juneau, Sheep Creek leads up a rocky gorge, choked with the brilliant greens of the mosses, to the upper pastures where the mountain sheep feed; here we found bears' tracks in the salmonberry bushes, and rejoiced in the sight of blue glaciers in the mountains. Here were *Coptis asplenifolia* and *Trientalis Europæa* and long reaches of scarlet *Castilleia*. I found more Cottonwoods and *Viburnums* in the cañon than I found elsewhere, and the mosses and lichens would have repaid several days of botanizing.

In looking over the records I find that the Alaska botanizing has been chiefly done at Sitka and Unalaschka, a few collections having been made on the Yukon. There is much rich material awaiting the systematic collector, and the wholly unexplored eastern slope of the Cascades will surely bring new species to light.

Macoun, in his "Catalogue of Canadian Plants," has indicated the results of the earlier and later botanists, and a glance at that list will show how much ground has yet to be explored.

Chilcat, at the entrance to the pass to the Yukon, is a level stretch between two mountain ridges lying at the northern extremity of the coast, where the turn westward is made. It must be rich in flowering plants, and the configuration of the land must make it a particularly interesting field for the botanist. A stop of thirty-six hours tempted us to remain for further exploration, but that was impossible. However, we visited an almost unexplored glacier (the Davidson), doing what no tourists had ever done before us, we were told. The glacier is a large one, but is slowly dying, the foot of it, which once pushed out into the sea, being now fronted by a terminal moraine from one to three miles broad. This is densely covered with vegetation, and would well repay a botanist's study.

Problems which confront a botanist in visiting a region new to him relate to the history of the flora spread out before him, its relation to the floras with which he is familiar, and the causes of difference. These questions find answer in the climatic influences of the present and those which have operated in the past; with, as well, the geologic history of the region, including great catastrophes, such as mountain building, subsidence or changes in climate due to ocean currents, or those vaster ones which produced a glacial period.

At present the climate of the southeastern coast of Alaska is mild and moist, being like that of Oregon and Washington, modified by the higher latitude, which brings with it long winters, when the moisture in the air, always abundant, falls in snow instead of rain, as farther south. These immense snow-fields, being too large for the short summers even with their Arctic heat to melt, temper the otherwise unmitigated intensity of a sun that shines for the greater part of the twenty-four hours.

The isotherm of 45° passing through Sitka is the same as that of Montreal. The January mean temperature of 1888 was 30.2°, and August of the same year 58.4°, the thermometer rising to 89° and 90° on the hottest days. This mildness and moisture comes from the prevailing winds which blow in-shore from the warm equatorial current, that turns across the ocean from Japan and then sweeps down the coast, giving California its delightful climate and making the most magnificent forest belt in the world. The trees are few in species, mostly conifers, with a sprinkling of cottonwoods, but they are densely crowded and grand in height and diameter, their coverts luxuriating in mosses and lichens.

The long winter, with its abundant congelation, and the short summer, effect a snow-line which is comparatively low at Juneau, 58° north, being about 3,500 feet. This produces a crowding of the plants, alpine and sub-alpine, low down upon the mountains, particularly where the glaciers descend to the sea.

In a climb of three thousand feet one passes species found in California, Washington, New England, Greenland and Labrador, or finds the same species in fruit, flower and bud. Looking over the plants of my collection, I note that they fall into four classes according to distribution.

First, those confined to the range of the forest belt; *i. e.*, from the Aleutian Islands to California, climbing the mountains as they descend; such are:

Gentiana Douglasiana, Bong.
Vaccinium parvifolium, Smith.
Romanzoffia Sitchensis, Bong.

Second, those which follow the mountain ranges southward, and extend eastward to the Rocky Mountains:

Bryanthus glanduliflorus, Gray.
Castilleia miniata, Dougl.
Mimulus luteus, Linn.

Third, those plants whose range is eastward to New England, and westward to Japan or Siberia:

Cornus Canadensis, Linn.

Heracleum lanatum, Michx.
Veratrum viride, Ait.
Streptopus roseus, Michx.

Fourth, those cosmopolitans of the Arctic circle or alpine plants which find a home in Greenland, Arctic America, Europe and Asia:

Pedicularis Langsdorffii, Fisch.
Ranunculus pygmæus, Wahl.

This classification marks, perhaps, degrees of vigor in withstanding climatic influences, the last group being the hardiest in constitution, the first being most affected by disturbing influences, and so occupying only the narrow belt which was most conducive to their well-being. I like to think of Alaska as being near the home land of the present earth's flora, within that circle of distribution around the pole, whose radius met the circumference in Greenland on the one hand and Europe on the other; when, in the tertiary period, the temperate floras stood together north of the Arctic circle.

The mind surveys the change that drove before the advancing glaciers the present Arctic plants down to the latitude of the Ohio, and sees again the return of the exiles north toward their trysting-place, until we find the best travelers close up to the Arctic circle, uniform or nearly so around the pole, while lower down the weaker brethren remain in widely different belts, or perhaps are slowly traveling still, though far in the rear. In the first group we find distinctively western forms of not so close relationship to those of Asia as are the eastern American, due probably to the fact of the great elevation and longer glaciation of the west coast.

Here in Alaska we have mountains which seem not to have been free of ice since the glacial period; so here we appear to stand on the borders of the retiring ice age, and survey from this vantage ground the present world-flora and the mysteries of its past history.

Scores of questions which sought to penetrate that mysterious past crowded the mind on that wonderful day when we invaded the ice-fields themselves and steamed fearlessly up Glacier Bay among the threatening icebergs, and anchored under the mile-wide façade of the great Muir glacier, lifting its blue wall of ice two hundred feet above the bay. Here we were in the very workshop of Nature, and world-building was in active process with the wonderful implement that the glacier has proved to be still working its will upon the plastic earth.

Glacier Bay is thirty miles long, and hundreds of acres of ice from a dozen glaciers are pushing relentlessly down to the sea from such peaks as Crillon and Fairweather, that tower in majestic whiteness fifteen thousand and sixteen thousand feet above us.

It is a weird and magnificent scene! The bare, brown shores are scoured and scored with recent ice; the blue bay floats icebergs of curious forms, all rich in coloring, pure white, deep blue or green, or shaded and toned with debris, while over beyond the peaks of the Fairweather range stand shoulder to shoulder in quiet, calm majesty.

What is this activity we see before us? What is Nature about? Have we indeed tracked the glacial period to this point in its retreat from the South, or have these mountains arisen since then? It is a retreat, surely, for high above our heads, two thousand feet up the mountain side, we see the footprints of former ice-fields, while the flowers, *Epilobiums* and Gentians, are waving their gay pennons of triumphant advance wherever the moraine gives them vantage ground. Is not this the place to study the floral repeopling of the Northern areas?

Dr. Russell, in his account of the expedition to Mt. St. Elias, speaks of Blossom Island, surrounded by perpetual snow, yet producing spruces, ferns, hellebore, gentians, orchids and berry-bushes. Who will tell us how these adventurers came there? What means of dissemination or strength of constitution have they that gives them the advantage?

Another question meets us: if, indeed, our temperate floras are on the march, in what order have the exiled plants followed the glaciers? Is it mere hardiness of constitution or better means of dissemination that bring the birch and alder close up to the Northern tree-line? Is the oak as sure to follow, but by easier stages, as befits its dignity?

We have been too prone to consider our present floras as fixed, but are there not many indications of change under our eyes to-day? Dr. Gray and Dr. Hooker have left many problems of distribution for us younger ones to puzzle over.

A look to the future shows us that many fossil treasures are in this retreat of the ice slowly coming to light again. To those already found we owe much that we know of the history of the tertiary period, but that history will surely be rendered more vivid if a few generations of note-taking botanists study on their own ground the rapidity with which vegetation follows the retreating glaciers, and learn the order of its march.

Alaska will give us object lessons, if we will but heed them, and no more interesting or accessible field presents itself to American botanists.

Leucobryum minus, Hampe.

Through the kindness of Mr. Carruthers and Mr. Gepp of the British Natural History Museum, I have been able to see the type of this species, which has been variously confounded with *L. albidum* (Brid) Lindb. by European authors, including Braithwaite in his supplement to the British Moss-Flora, p. 295, and Limpricht in Rabenhorst's Kryptogamen Flora, iv., 421. Authentic specimens, compared with the type, were sent to Dr. Braithwaite, and he admitts that all the synonymy on page 296 l. c., except the last line, should be omitted. Mr. Kern also kindly sent a specimen of his Lago Maggiore collection, mentioned by Limpricht, l. c., and this also proves to be not our *L. minus*, Hampe, but the species known as *L. albidum* (Brid.) Lindb. Hampe's specimen was collected in "lignis putridis, ad flume Savannah, Ga.," by Beyrich, and is the characteristic moss of our Southern States, distributed by Sullivant in his Musci Alleghaniensis, No. 169, as *Dicranum glaucum*, var. *albidum*, Brid. from Georgia, Alabama, and Louisiana; also by Austin in his Musci Appalachiani, 477, as "*L. vulgare*, var. *minus*, (*L. minus*, Hampe) from the Southern States, common;" but the reference to Sullivant Mosses U. S., page 24, is wrong, as Sullivant referred to the smaller of the Northern States species, which has been separated from *L. glaucum* (L.), and which is identical with the European specimens described by Braithwaite and Limpricht. Sullivant and Lesquereux are partly responsible for some of the confusion into which we have fallen, for No. 98 Musci Bor. Am. is a mixed specimen, distributed as "*L. minus*, Hpe. Hab. in Ohio," but containing both *L. minus* and *L. albidum*. The specimens from Lancaster, Ohio, in Sullivant's own herbarium, however, are all the northern species agreeing with European specimens, and not *L. minus*, Hpe. Further confusion has been caused by Lesquereux and James' Manual, page 91, where *L. minus*, Hampe, is cited as a synonymn of *L. minus*, Sulliv., which it is not, and the true *L. minus*, Hpe. is described as *L. sediforme*, Mueller. Again authentic specimens were sent to Dr. Carl Mueller and he says "*Leucobryum minus*, Hpe. tuum non est meam *L. sediforme*, Syn. Musc. differentiam inter speciem utramque perfecte descripsit. Huosque tantam insula Hispaniola accepi." That is, *L. sediforme* is not our Florida species.

Authentic specimens from Florida were also sent to William Mitten, who says in part "I have Drummond's 46, *D. glaucum* var. *albidum*, from New Orleans, and a small specimen from James, marked by him '*L. sediforme?* Florida, Palmer,' and another small specimen from Florida collected by LeConte. All these have the short, wide, appressed foliage so evident in your specimen. I have also a scrap of Sullivant No. 77 *L. minus*, Hpe., Ohio, with longer, narrower, more spreading leaves." Acting on Dr. Mitten's suggestion I sent to Paris authentic specimens of *L. minus*, Hpe. in this case a portion of Austin's Musci Appalachiani, No. 477, for comparison with Michaux's type of *D. glaucum pumilum*, at the Jardin des Plantes. M. Franchet kindly sent me a fruiting plant, and Mr. A. F. Foerste made a series of measurements for me, which prove Michaux's specimens to be the same species as Hampe's *L. minus*.

Michaux in his Flora Bor. Am. ii. p. 297 (1803) says: "Dicranum glaucum: *pumilum*. D. caulibus ramosis, densissima foliatione crassis, foliis glaucis, convexo-canaliculatis. sporangio subinclinato, oblongo-ovato; operculo gracilter subulato, subinflexo. Obs. Mea varietas humillima, foliis acuminatis. Hab. in Carolina." Now in view of the confused state of the name *L. minus*, both in America and in Europe, would it not be well to adopt Michaux's prior name for the plant of the Southern United States, and call it *L. pumilum* (Michx.), 1803, (*L.*

minus, Hpe.), 1839; and Bridel's name for the specimens from Ohio and the Northern United States (*L. minus*, Sull.), and call them *L. albidum* (Brid.) Lindb.? In order to be certain that Bridel's *D. albidum* is the same as the Ohio specimens in Sullivant's herbarium, I have asked Dr. W. G. Farlow to make the comparison for me at Berlin, and he has kindly consented to, and taken a portion of Sullivant's specimens for that purpose. I have not yet heard from him, but meanwhile this much is certain, that *L. minus*, Sulliv. of Lesquereux and James' Manual, p. 91, is not the same as *L. minus*, Hpe., and that the description of *L. sediforme* of the Manual is meant for specimens of the same Hampe's *L. minus*. What the European specimens shall be called, however, had better be determined by some one who has more ready access to the types than I. M. Bescherelle, to whom M. Franchet also referred the question, says, "J'ai etudie le Bryum glaucum minus forma pumilum de Michaux, et je n'y vois aucune difference avec le *Dicranum albidum*, Brid." But I doubt the correctness of this statement unless he has seen Bridel's type, for Bridel in his Bryologia Universalis i. 409, 1826, cites the following localities for *D. glaucum*, var. *albidum*, "Pennsylvania, Virginia, et Massachusetts unde D. Torrey misit." One of these specimens is preserved in the Torrey Herbarium, labelled "Dicranum albidum, No. 14, legit Schweinitz, Pennsylvania," and is identical with Sullivant's specimens from Ohio, having the leaves longer than *L. minus*, Hpe., apex more acuminate, hyaline border of the base narrower. The difference in the aspect of the two also is very marked, *L. minus*, Hpe. being shorter, denser, with more crowded leaves, which are more closely imbricated and erect, with incurved cucullate apex. The range also is different, *L. minus*, Hpe. not having been collected thus far north of Carolina, while *L. minus*, Sull. occurs throughout the Northern States, also running south into Louisiana.

I shall be pleased to receive and examine specimens of *Leucobryum* from any and all collectors.

ELIZABETH G. BRITTON.

The Flora of a Montana Pond.

R. S. WILLIAMS.

A few miles from Great Falls, near the middle of a low flat extending out from the valley of Sand Coulee, is a slight circular depression in the clayey soil, perhaps two hundred yards across. In rainy seasons this is filled with water to a depth of three or four feet in the center, gradually diminishing in depth toward the edges. It is entirely without springs and has no particular inlet or outlet. Last season, after having been dry and almost without sign of vegetable life for a year or more, it was filled with water, and the following notes relate to the abundant vegetation that sprang up from a seemingly lifeless clay-bed. Reference also will be made to the plants observed on the surrounding prairie, within a distance of a few hundred yards of the water, but the observations, relating to the latter part of August, do not include, of course, many noticeable species of the spring and early summer.

The most abundant grass of the vicinity was *Agropyrum glaucum*, of a growth sufficient to make an excellent hay crop. Mingled with this, and occasionally the more abundant of the two, was found *Alopecurus Californicus.* This is a western species, and was determined by Dr. Vasey, who remarked that he had not before received it from any point so far to the eastward. Dead culms of this *Alopecurus* that had matured seed in June were standing on the same plants beside the still green, but ripening culms of a second growth. *Bouteloua oligostachya* was common as elsewhere, often being the principal grass on any slight knoll or hillside. The only other grass observed was *Schedonnardus Texanus.* It occurred mostly in separate areas in rather compact patches a foot or so across, and although growth had ceased for some time it was perhaps more noticeable than earlier, owing to the dry, whitish appearance of the slender, curved culms that stood out in all directions in an intricate network.

Mingled with these grasses were a few composites in bloom, the most conspicuous being *Grindelia squarrosa*, *Aster commutatus* and *Helianthus annuus.* *Gutierrezia Euthamiæ*, growing almost everywhere, was scarcely yet in flower, not being in full bloom till September, or even October. One more plant of this family, and perhaps the most curious and interesting of them all, was *Evax prolifera*, growing in low places where the grass was thin or altogether wanting. In many respects it resembles the Edelweis of the Alps, although its home and surroundings are so exceedingly humble as compared with that celebrated plant. Dead specimens of the *Evax* were very numerous in places, and resembled, more than anything else, small, blackish tufts of upturned fiberous roots. The stems and branches of the growing plants, indeed, are stiff and wiry, and would hardly be noticed were it not for the curious heads of woolly flowers they bear.

In about the same situations as the above, *Herpestis rotundifolia* was found abundantly both in flower and fruit. The range of this is given in the last edition of Gray's Manual as "Illinois to Minnesota, Missouri and southward," but in the Synoptical Flora of North America it is referred to as growing out of ordinary range in Fresno Co., California, and it evidently may prove to be more of a western plant than has heretofore been supposed. The corollas of the plants in the present case were perfectly white, with lobes just about equal and stamens of equal length. I called the attention of Prof. Eaton to these points, and he writes that he has evidently the same plant from Illinois, collected by Lesquereux, who notes, "corolla white, almost equally five-cleft." Possibly the normal color of the flower is white, although the botanies till recently have mostly given it as blue.

Other plants growing about the pond were *Limosella aquatica*, very abundant and often submerged in the water, *Rumex salicifolius*, *Verbena bracteosa*, *Œnothera triloba*, a common but inconspicuous species, *Krynitzkia Californica*, *Boisduvallia glabella*, abundant along the very edge of the pond, and *Gilia intertexta*, of which only a specimen or two was observed. These last two mentioned species are well-known western plants that here in Montana, at least, cross to the eastern slope of the Rocky Mountains.

The above about completes the list of species noted around the margin of the pond, and it will be observed does not include a shrub or tree of any kind. Doubtless rose bushes of stunted growth existed, but were overlooked at this season.

In the water the most conspicuous plant was *Eleocharis palustris* rising to a height of one or two feet above the surface, and affording shelter to a flock of some forty or fifty wild ducks. *E. acicularis* was the only other sedge noticed, and grew perhaps more along the edge of the pond than in the water. *Alisma Plantago* and *Sagittaria variabilis* were both common. *Potamogeton hybridus*, not before noted in Montana, filled the water in places with a tangled mass, while a single plant of *Naias flexilis* was found near the shore, but a somewhat prolonged search failed to reveal a second specimen. Two species of *Elatine* were abundant. *E. Americana* growing both on the muddy banks and submerged in the pond, and *E. Californica*, a western plant, only found submerged. This last has pedicelled flowers and much curved seeds. A few blossoms of *Utricularia vulgaris* rose out of the water, but the plants, which were common enough, were mostly not yet in bloom ; also a few plants of the *Herpestis* above mentioned were found in several inches of water with leaves mostly floating and flowers emergent. The only other aquatic flowering plant recorded was *Callitriche verna*, growing very abundautly in some of the shallower places.

A single moss was found mingled with the aquatic plants It was evidently a sterile, lax form of *Hypnum fluitans*, and was not common.

The three remaining plants collected at this time belonged to the Characeæ and were submitted to Dr. T. F. Allen. He writes that they are of much interest, the species being *Nitella clavata*, *N. opaca* and *Chara Altaica*, this last not before credited to North America, and originally coming from the Altai Mountains of Asia. The species were all quite abundant, and bore well-developed fruit. They were mostly growing near the margin of the pond in two or three inches of water, and were quite strongly attached to the mud of the bottom.

In closing I would make grateful acknowledgment to Prof. D. C. Eaton for assistance in determining all the more difficult species when not otherwise stated.

Great Falls, Mont.

Botanical Notes.

Sphagna from North Carolina. Since the list of North Carolina mosses was published, in the MEMOIRS, vol. iii. p. 37, a report on the *Sphagna* has been received from C. Warnstorf, and some corrections are necessary: *Sphagnum cymbifolium*=*S. imbricatum*, Hornsch, var., *cristatum*, Warnst. The unnamed *Sphagnum*=*S. imbricatum*, Hornsch, var., *sublæve*, Warnst. and *S. rigidum*=(when placed under the older name) *S. compactum*, var. *imbricatum*, Warnst.

J. K. SMALL.

The Host-Plant of Aphyllon Ludovicianum. In connection with Mr. Hill's article on page 17 of the BULLETIN for January, I would like to report that *Aphyllon Ludovicianum* is found here sparingly; on two occasions I have found it growing on roots of *Ambrosia trifida*, as a parasite.

JACOB SCHNECK.

Index to Recent Literature Relating to American Botany.

About Lichens. F. Leroy Sargent. (Popular Sci. News, xxvi. 50, 65-67, illustrated).

Almond Trees—A Disease of. Newton B. Pierce. (Journ. Mycol. vii. 66, illustrated).

American Hawthorns—The. (Gard. & For. v. 217), with an illustration of *Cratægus mollis* in New England.

Botany of the Zoological Park. W. Hunter, L. F. Ward and W. H. Knowlton. (Smithsonian Rept. 1890, 68-72).

This is a list of some 350 species and varieties, including the Pteridophyta, identified within the limits of the National Zoological Park, D. C. Accompanying the general report upon the Park there is also a separate list of the forest trees, in which forty-six species are enumerated (pp. 65, 66).

Cercospora circumscissa—Suggestions in regard to the Treatment of. B. T. Galloway. (Journ. Mycol. vii. 77).

Chilian Pine—The. (The Garden xli. 32). With illustration of *Araucaria imbricata.*

Club-Root in the United States. A. C. Eycleshymer. (Journ. Mycol. vii. 79). With illustrations of *Plasmodiophora brassicæ*, Wor.

Coontie and Conte. E. J. Hill. (Gard. & For. v. 208).

An interesting note on the identity of Coontie or Wild Sago of the Seminole Indians with *Zamia integrifolia*, Willd. Owing to the similarity of the common names of the two plants it has been confounded with *Smilax Pseudo-China.*

Dendrophthora cupressoides. (Hooker Icon. Pl. t. 222 1).

Descriptions of new Plants from Southern California, Nevada, Utah and Arizona. F. V. Coville. (Proc. Biol. Soc. Washington, vii. 65-80; reprints).

These were mainly obtained by Mr. Coville himself, while botanist of the Death Valley biological expedition of last year. *Aplopappus interior, Arctomecon Merriami, Arctomecon humile, Arenaria compacta, Brickellia desertorum, Buddleia Utahensis, Erigeron calva, Erysimum asperum perenne*, Watson, *Frasera tubulosa, Gilia setosissima punctata, Isomeris arborea globosa, Lepidospartum striatum, Mentzelia reflexa, Phacelia perityloides, Potentilla eremica, P. purpurascens pinetorum, Sarcobatus Baileyi, Saxifraga integrifolia sierræ, Stylocline Arizonica* are described as new.

Desmodium nudiflorum. (Meehan's Month. ii. 65, with illustration).

Doassansia, Cornu—An Examination of the Species of the Genus. William Albert Setchell. (Ann. Bot. vi. 2; with plates i and ii).

The new species described are *Doassansia opaca, D. obscura. D. deformans.* Two new genera—*Cornuella* and *Burrillia*—are established, each with one species.

Evolution of Bubbles of Gas by Plants in Water exposed to Light, as a Measure of Assimilation—The. A. F. Woods. (Publ. Nebraska Acad. Sci. ii. 13; abstract).

Ferns of the Black Hills. Chas. E. Bessey. (Am. Nat. xxvi. 252).

Field Notes, 1891. Erwin F. Smith. (Journ. Mycol. vii. 88).

A record of observations on the various fungous diseases of fruit trees.

Flora Franciscana. Part III. Edward L. Greene. (pp. 281-342; issued April 1st, 1892).

The following species are described as new: *Eschscholtzia ambigua; Ranunculus alismellus* (*R. alismæfolius*, var. *alismellus*,

A. Gray); *Delphinium ornatum ; Thalictrum cæsium; Sambucus callicarpa* (*S. racemosa*, A. Gray, Bot. Cal., not L.); *Meconella Californica* is referred to the genus *Platystemon* as *P. Torreyi ; Ranunculus Nelsoni*, A. Gray, is maintained as a species. Sarmentosæ is the ordinal name adopted for the grapes, dating from L. Gerard (1761), Ampelideæ, H.B.K. being published in 1815; *Osmorrhiza*, Raf. is included in *Myrrhis ; Razoumofskya*, Hoffm. is accepted for *Arceuthobium*, following O. Kuntze; *Obolaria*, Siegesbeck, replaces *Linnæa*, Gronov., but Siegesbeck's name dates from 1736, a year before Linnæus' Genera Plantarum, and *Caprifolium* another pre-Linnæan name replaces *Lonicera.*

Flora of Nebraska—Additions to the. G. D. Swezey. (Publ. Nebraska Acad. ci. ii. 16; abstract).

Flora of the Artesian Well—Notes on the. J. R. Schofield. (Publ. Nebraska Acad. Sci. ii. 23; abstract).

Flora of the Black Hills—Notes on the. Chas. E. Bessey. (Publ. Nebraska Acad. Sci. ii. 17; abstract).

Flora of Western South Dakota—Notes on the. T. A. Williams. (Am. Nat. xxvi. 60; 253).

Flowers and Insects, Asclepiadaceæ to Scrophulariaceæ. Ch. Robertson. (Trans. Acad. St. Louis v. 569).

Flowers and Insects, Umbelliferæ. Charles Robertson. (Trans. Acad. St. Louis v. 449).

Forests of Lower California—The. C. R. Orcutt. (Gard. and For. v. 183).

Notes on *Pinus Parryana, P. monophylla, P. Jeffreyi*, var. *peninsularis*, with illustration of the latter, and of a view of a pine forest in Lower California.

Fossil Plants from the Wichita or Permian Beds of Texas. I. C. White. (Bull. Geol. Soc. Am. iii. 217, 218).

By the determination of these species the author has been able to correlate the Texan beds with those of the Dunkard Creek series of Pennsylvania, West Virginia and Ohio. Some twenty species are listed, in the genera *Sphenophyllum, Annularia, Odontopteris, Callipteris, Callipteridium, Pecopteris, Goniopteris, Lepidodendron*, and *Walchia.*

Fungi—New Species of. J. B. Ellis and B. M. Everhart. (Journ. Mycol. vii. 130).

Puccinia Suksdorfii, Stictis compressa, Tryblidiella pygmæa, Valsaria hypoxyloides, Phyllosticta gelsemii, Phyllosticta rhododendri, Sphæropsis albescens, Stegonospora spinaciæ, Septoria elymi, S. Jackmani, S. saccharina, S. Drummondii, Hendersonia geographica, Glœosporium catalpæ, G. decolorans, Melanconium magnoliæ, Pestalozzia lateripes, Scolecotrictrum caricæ, Macrosporium tabacinum, M. longipes, Brachysporium Canadense and *Clasterosporium populi.*

Fungous Diseases of Iowa—New. L. H. Pammel. (Jour. Mycol. vii. 95).

Fungus of a Potato Scab—Remarks on the. G. de Lagerheim. (Journ. Mycol. vii. 103).

Ginseng—Notes on. (Am. Nat. xxvi. 343).

Hand-Book of West-American Cone-Bearers. J. G. Lemmon. (Pamph. pp. 24, 2d Edition, Oakland, Cal. 1892).

This, in the language of the author, consists of "approved English names, with brief popular descriptions of the cone bearing trees of the Pacific Slope, north of Mexico and west of the Rocky Mountains." It will prove a useful paper for all who are interested in these wonderful forests, and may be obtained from him at 25 cents per copy.

Hepaticæ of the Hawaiian Islands. A. W. Evans. (Trans. Conn. Acad. viii. pp. 9, reprinted, plates xxii. xxiii).

This enumeration is based on the collections made by D. D. Baldwin in 1875–'76, in the herbarium of Prof. D. C. Eaton, portions of which were examined and named by C. F. Austin. Nine new species are described in the following genera: *Porella, Bazzania, Plagiochila, Jungermannia, Nardia* and *Tylimanthus.*

Myriostoma coliforme, Dicks. in Florida. A. P. Morgan. (Am. Nat. xxvi. 341).

Nebraska—Preliminary Report on the Native Trees and Shrubs of. C. E. Bessey. (Bull. Agric. Exp. Sta. Nebraska iv. Article 4).

Nebraska—Second Report upon the Native Trees and Shrubs of. C. E. Bessey. (Ann. Rep. Nebr. State Hort. Soc. 1892; reprint).

Nebraska—Sixth Annual Report of the Botanist to the State Board of Agriculture. C. E. Bessey. (Ann. Rep. Nebr. State Board Agric. 1892; reprint).

This is a preliminary list of the grasses of Nebraska, with notes on their distribution throughout the State.

Northern Limit of Sabal Palmetto. W. F. Massey. (Gard. & For. v. 189).

Notes on the Flora of Cap-à-L'Aìgle—Supplemental. Robert Campbell. (Canad. Rec. Sci. v. 38).

Osmunda Claytoniana, L., and *O. cinnamomea*, L.—*On the Prothallium and Embryo of.* Douglas Houghton Campbell. (Ann. Bot. vi. 49, with four plates).

Peronospora—Description of Two New Species of. M. B. Waite. (Journ. Mycol. vii. 105).

Peronospora celtidis on *Celtis occidentalis*, and *Peronospora hydrophylli* on *Hydrophyllum Virginicum* are described and figured.

Peronosporaceæ in the Herbarium of the Division of Vegetable Pathology. W. T. Swingle. (Journ. Mycol. vii. 109).

Phenomena and Development of Fecundation. H. J. Webber. (Am. Nat. xxvi. 111, 287, with plates.

Pithecolobium Saman. (Gardn. Chron. xi. 256, illustrated).

Primitiæ Floræ Costaricensis. Th. Durand and H. Pittier. (Bull. Soc. Bot. Belg. xxx. 7-97).

This is the first instalment of an account of the Flora of Costa Rica, and contains an introduction, giving notes on the collections hitherto made in that country, and of those recently obtained by M. Pittier. This is followed by an enumeration of the Lichens by Dr. J. Mueller, including 214 species, of which a large number are described as new.

Pyrenomycetes—The North American. J. B. Ellis and B. M. Everhart. (8vo, pp. 800, 41 plates, 1892).

This extensive contribution to mycological botany is welcomed by every lover of fungi, and particularly by those who are engaged in a critical study of the groups covered by this new manual.

Thorough work in the Pyrenomycetes has been long retarded from a lack of accessible full and clear descriptions of the species, the student needing to rely upon a scattered literature and at last resorting to type specimens, many of which are imperfect or entirely lost. The system of classification followed by the authors has been that of Winter in Kryptogamen Flora (Die Pilze), while Saccardo's principles of arrangement have frequent recognition. Priority of authorship is maintained by the use of parenthesis in all cases when a generical transfer has been made, and none but the author is recognized. In the preface the authors say: "The piratical practice of omitting the first name and substituting the second in its place cannot be too strongly condemned."

Some sub-orders open with a key to the genera, and the wish naturally arises that all groups had been thus prefaced. A key to the sub-orders would also have been welcomed. There is a full index of species, but no corresponding list of the hosts. The forty-one page plates are from drawings by the late F. W. Anderson, who worked from living specimens and presented the salient characters of many of the genera, thus adding greatly to the value of the work. Dr. T. J. Burrill elaborated the Erysipheæ with his usual care.

The work stands as a monument of painstaking effort, upon the part of the authors, to place within the reach of American mycologists a guide to the study of an important and difficult family of fungi. B. D. H.

Sereno Watson. W. H. B. (Am. Journ. Sci. xliii. 441; reprint).

Slime Moulds (Myxomycetes) of Crete. A. T. Bell. (Publ. Nebraska Acad. Sci. ii. 15; abstract).

Spraying for the Prevention of Plant Diseases. Jos. F. James. (Sci. Am. Suppl. xxxiii. 136).

Suggestions on the Classification of Metaphyta. Conway MacMillan. (Bot. Gaz. xvii. 108).

Two Schools of Plant Physiology as at Present Existing in Germany and England. Emily L. Gregory. (Am. Nat. xxvi. pp. 211-217, 279-286).

Vascular Cryptogamia of the Island of Grenada—On the. J. G. Baker. (Ann. Bot. vi. 95).

Acrostichum Sherringii is described as new.

Yuyucha, La. M. G. Lagerheim. (La Notarisia vii. 1376).

A note on *Nostoe commune*, Vauch., an edible alga from Ecuador.

Proceedings of the Club.

WEDNESDAY EVENING, MARCH 30TH.*

The President in the Chair and twenty-three persons present.

The President appointed the following members of the Field Committee for 1892: Mr. Henry Kræmer, Rev. Geo. D. Hulst, Dr. L. Schœney, Miss L. R. Heller, and Mrs. H. L. Smith.

Dr. Morong and Dr. Rusby were appointed delegates to the Council of the Scientific Alliance for the year 1892-'3.

The following were elected active members: Miss H. E. Powers, Baldwins, Long Island; Mr. Geo. V. Nash, Clifton, N. J.; and Dr. H. S. Pepoon, Lewiston, Ill.

The following were elected corresponding members: Rev. C. H. Demetrio, Emma, Saline Co., Mo.; Rev. A. B. Langlois, St. Martinville, La.

Dr. Rusby read the announced paper of the evening on "A Preliminary Account of the Plants collected by Mr. Miguel Bang in Bolivia, with a Description of the floral features of that region." The paper was profusely illustrated by herbarium specimens.

WEDNESDAY EVENING, APRIL 27th.

Dr. Britton in the Chair, and twenty-seven persons present.

Miss M. Parke, Dr. Donald Barstow and Mr. Frank O. Payne were elected active members.

The chairman exhibited specimens of *Clintonia umbellata*, collected by Mrs. W. H. H. Beebe near Short Hills, N. J. This discovery adds a new plant to the New Jersey Flora and to the Flora of the 100 mile circle, the nearest hitherto reported station for the species being in the Alleghenies of Pennsylvania. Dr. Britton also showed two curious hard black seeds, reported as coming from the coast of California, where they are said to be worn as watch-charms. He had been unable to refer these satisfactorily, but they closely resemble the figure of *Calvaria hexangularis* in Gærtn. Fruct. and Sem. iii. 117, t. CCI. This genus is known only by its seeds.

Dr. Smith Ely Jelliffe gave the announced paper of the evening on "Lichens: an account of the more common species," illustrated by lantern views and herbarium specimens.

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* Accidentally omitted from the last BULLETIN.

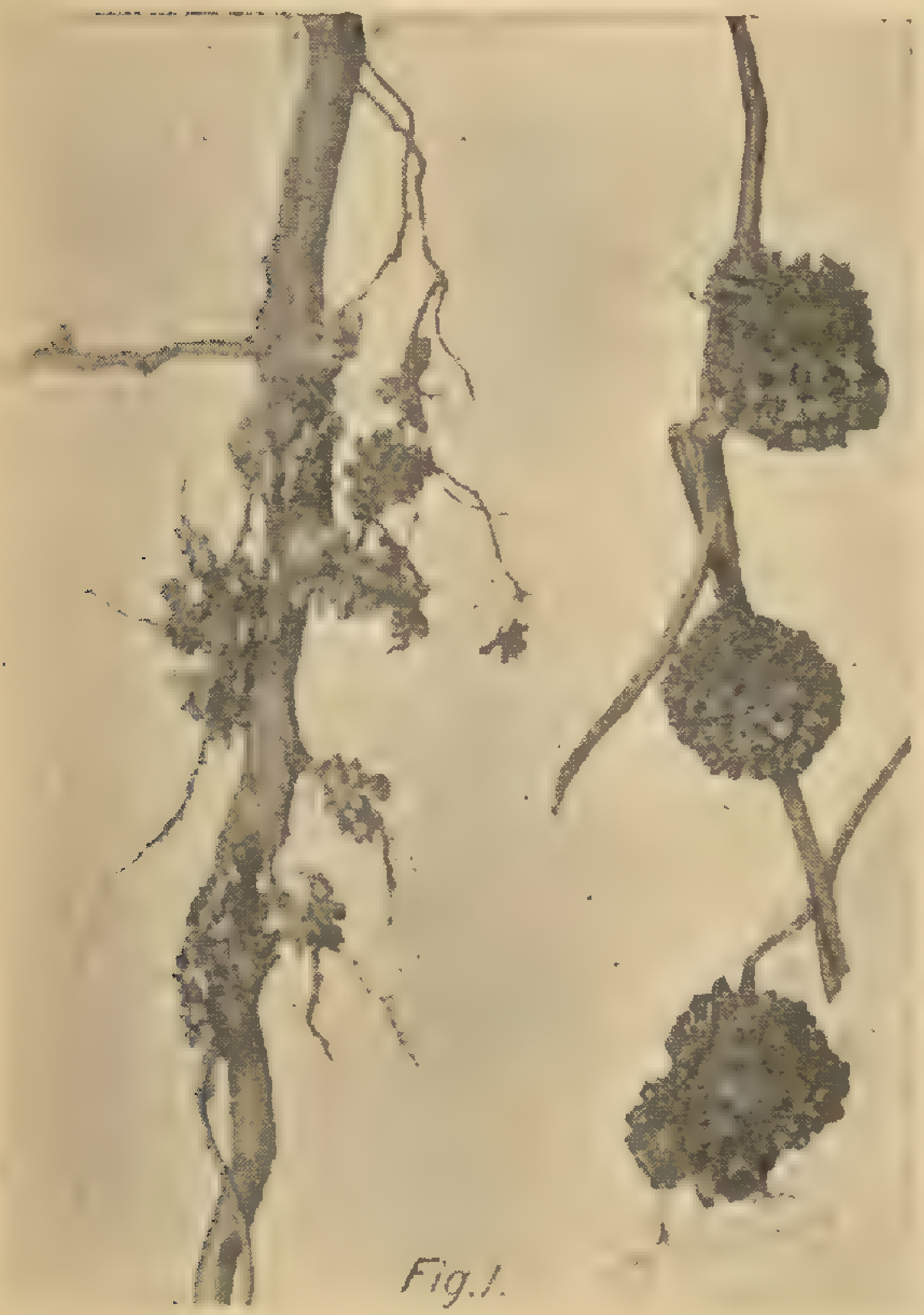
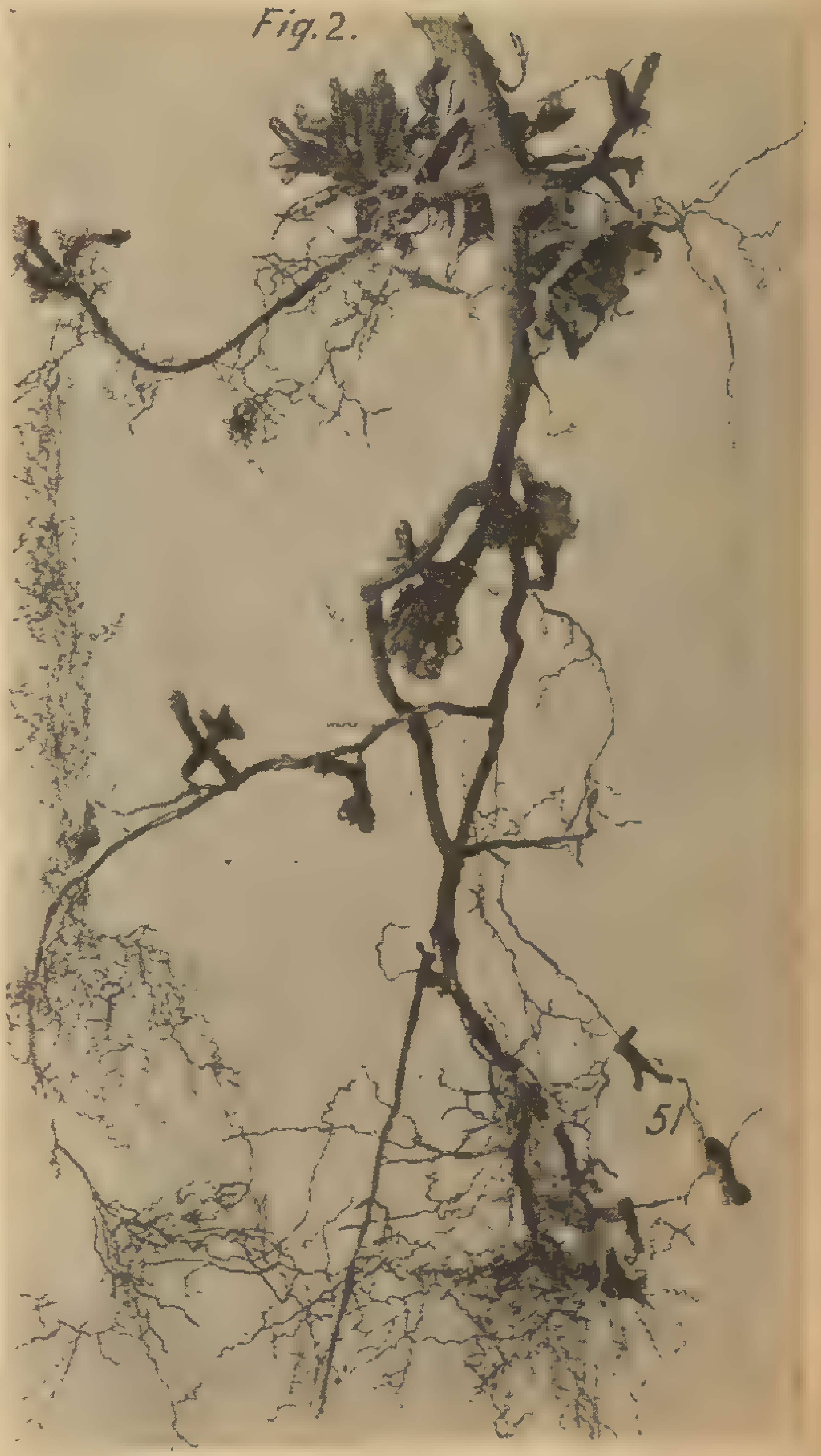


Fig. 1.



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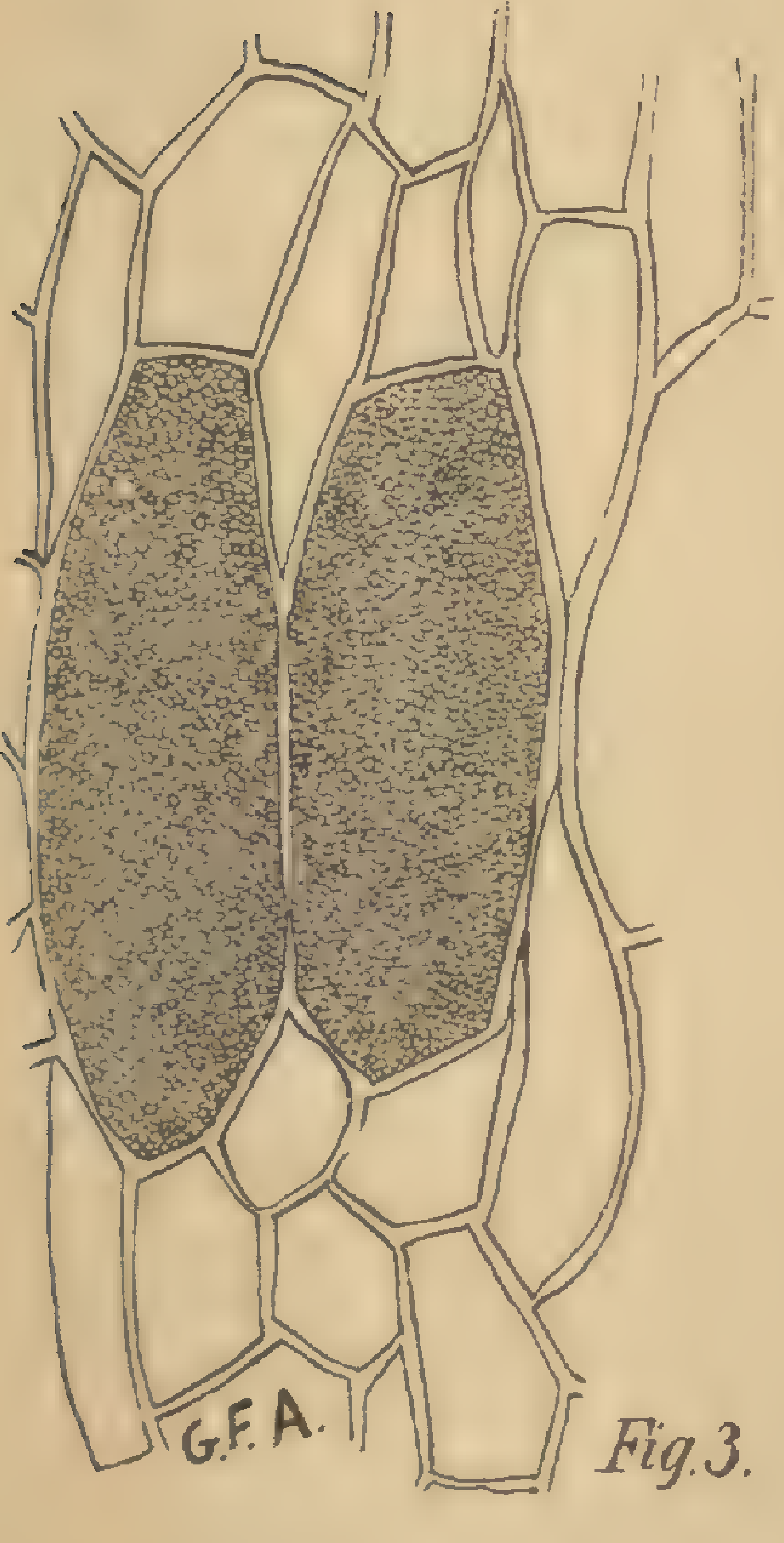

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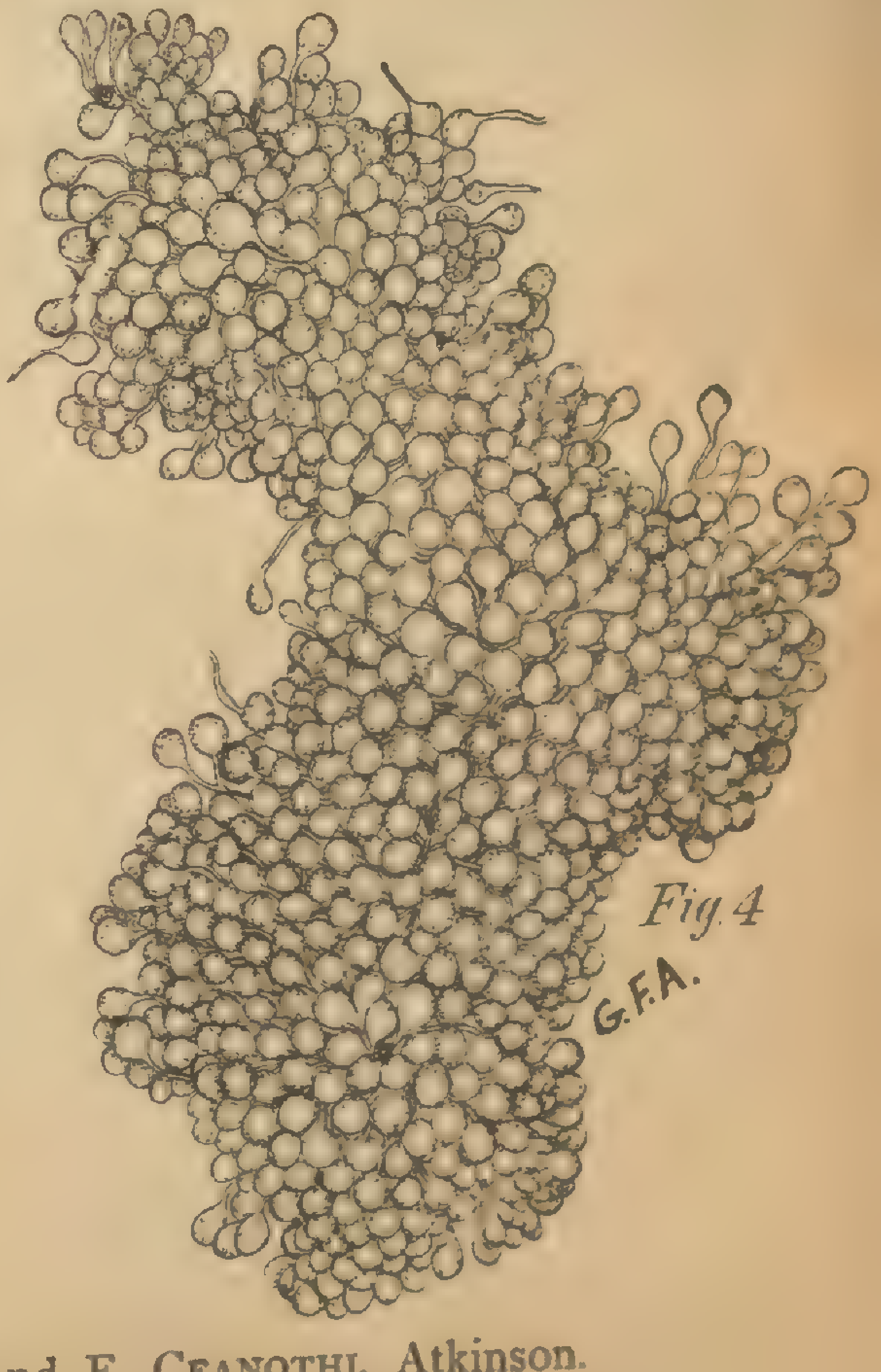

Fig. 4

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Vol. XIX. JULY, 1892. No. 7.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

A MONTHLY JOURNAL OF BOTANY.

Edited by

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.

Observations on some American *Rhizobia*: *A. Schneider* (Plates CXXIX and CXXX) 203

New or Noteworthy North American Phanerogams.—VI: *N. L. Britton* 219

Eriocaulon bilobatum, n. sp.: *Thomas Morong* 226

Programme of the International Botanical Congress of Genoa, 1892 227

Botanical Notes.—Note on some Characeæ: *T. F. Allen*; Request by the Editor of "La Notarisia" 230

Recent Literature relating to North American Botany.—The American Species of the Genus *Anemone*; Flora Brasiliensis: Kralvaceæ: Additions to the North American Species of Laboulbeniaceæ; List of Species of the Genera *Scirpus* and *Rynchospora* occurring in North America: Manual of the Phanerogams and Pteridophytes of Western Texas Gamopetalæ: New or Noteworthy Species: Notes on *Carex*; Novitiæ Peruvianæ; Palæontology of the Cretaceous Formation on Staten Island; Plantæ Glaziovianæ: Revision of the North American Species of *Rumex*; On certain Spiræaceæ: Tertiary Fossil Plants from Potosi, Bolivia, and briefer notices 231

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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XIX.] New York, July 13, 1892. [No. 7.

Observations on some American Rhizobia.

By A. Schneider, University of Minnesota.

Plates CXXIX and CXXX.

The purpose of this paper is: first, to give a short review of "Pilzsymbiosis;" second to point out and discuss somewhat the existing controversies; and third, to show that there are probably more than one species of *Rhizobium*.

It is only within recent years that the symbiotic relations of fungi with plants have been discovered and studied. Half a century ago some of the fungi which are now known to be symbiotic were studied and described without suspecting their real nature. Theo. Hartig in 1840 made drawings and gave a description of the "mykorhiza" of *Pinus sylvestris*, taking it to be a purely parasitic fungus. With this in view, at the "Botanischer Verein in München," Nov. 11, 1885, R. Hartig criticises Frank for claiming to have discovered the symbiotic relations of *Rosellinia quercina* with the oak To my knowledge nothing of any moment had been done on Pilzsymbiosis prior to 1885. B. Frank no doubt is the most earnest worker and has done more than any other man to clear up some of the mysteries concerning the subject. Probably he often becomes too enthusiastic over his discoveries, claiming for instances that many trees, especially of the Cupuliferæ, cannot develop without the symbiotic fungi. R. Hartig seems to be of the opposite turn of mind. In his "Anatomie und Physiologie der Pflanzen," 1891, he sums up Pilzsymbiosis as follows: "Fungi probably belonging to the Tuberaceæ or Gastromyceteæ are found parasitic on, or symbiotic with certain trees, especially the Coniferæ and Cupuliferæ. In some cases they form a true mycorhiza (fungus root)." He does not seem to think that these fungi are of any use to the plant, but, on the contrary, more or less harmful by taking nourishment properly belonging to the plant. The hypertrophic condition of the infested root is probably caused by an irritating substance secreted by the fungus. But many forest trees of different varieties showed no traces of the root fungus.

In 1887 Hellriegel and Willforth concluded a long series of experiments which led to a new hypothesis in regard to the free-nitrogen-assimilating function of the Leguminosæ. Notes on these experiments dated back from the years 1862 and 1863. They were conducted under the direct supervision of Hellriegel. Among his assistants were H. Roemer, R. Günther, H. Moeller and G. Wimmer. Without going into details their conclusions may be summed up as follows:

1. Leguminous plants develop in sterilized soil.
2. Addition of sterilized nitrates increased their growth.
3. In harvest time there was no excess of stored nitrogenous material which could have come from any other source than the soil.
4. In non-sterilized soil the Leguminosæ developed better than in sterilized soil, especially if there was added a solution made from soil in which leguminous plants had grown (culture soil solution).
5. In harvest time there was found stored up in the plant an overplus of nitrogenous compounds which could not have been taken from the soil.
6. Leguminous plants in sterilized soil to which only a small amount of the above mentioned culture soil solution was added showed this overplus of nitrogenous compounds.
7. One and the same Leguminous variety did not give like results with different culture soil solutions.
8. Leguminosæ in non-sterilized or sterilized soil inoculated with the culture soil solution developed tubercles.
9. Leguminosæ in sterilized soil developed no tubercles.
10. In the same plant, if one side of the root was dipped in

normal culture soil solution and the other in sterilized culture soil solution the former developed tubercles, the latter not.

11. A period of dwarfed growth was noticed after inoculation with the culture fluid.

12. During this period tubercles kept on developing.

13. In soil free from nitrates active growth began only after the formation of tubercles.

Hellriegel's final summing up is as follows:

1. The Leguminosæ have another source besides the soil from which to draw free nitrogen.

2. This second source is the free nitrogen of the air.

3. The plant itself has not the power to assimilate this free nitrogen.

4. Active micro-organisms perform this function for the plant.

5. The tubercles stand in intimate relations with the free nitrogen assimilating power of the Leguminosæ.

In 1890 Frank wrote an article entitled "Pilzsymbiose der Leguminosen" in which he not only verified Hellriegel's conclusions, but also studied and described the micro-organisms connected with this nitrogen-assimilating function. His conclusions may be briefly summed up as follows:

1. Some Leguminosæ live in symbiotic relations with a very simple fungus which infects the plant as soon as it begins to develop.

2. This fungus belongs with the smallest organisms. It is one of the Schizomycetes, the *Rhizobium leguminosarum.*

3. It very likely develops and multiplies in the soil. It is present in all natural soils, at least to some extent.

4. Roots of the Leguminosæ have the property of excreting a peculiar substance which attracts the spores of the fungus. Some of these spores develop on the outside of the root, others are conducted into the interior of the root tissue by peculiar protoplasmic strands built up by the normal cells of the plant (*Infektionsfäden*).

5. The fungi combine with the protoplasm of the cells, forming a mixture called "mycoplasm." The fungus may be found in nearly all parts of the plant, even in the seed. A new plant may be infected from the spores in the embryo.

6. At the point of infection a tubercle develops. This consists of parenchymatous tissue rich in protoplasm in which the spores develop and multiply very rapidly.

7. The mycoplasm becomes differentiated into nitrogenous (albuminous) "Formelemente"—the "Bakteroiden." These resemble bacteria.

8. At the close of vegetation these stored bacteria-like collections of albuminous substances are again absorbed and utilized by the plant.

9. Some tubercle-producing fungi of the Leguminosæ are purely parasitic; that of *Phaseolus vulgaris* probably belongs to this group.

10. In most Leguminosæ the *Rhizobia* have the power of appropriating for the use of the plant free nitrogen of the air.

11. There is probably only one species of the *Rhizobium* which is present in all normal soils.

12. Leguminosæ in rich soil develop few, if any tubercles. Plants in poor soil stand in closer symbiotic relations with the *Rhizobia.*

Frank's conclusions in regard to Pilzsymbiosis as they appear in Heft 7, 1891 of the "Berichte der Deutschen Botanischen Gesellschaft" may be briefly summarised as follows:

1. Endotrophic mykorhiza is found in roots of Orchids, Ericaceæ and other plants.

2. In the Orchids the mykorhiza consists of a collection of yellowish interwoven septate hyphæ, generally found in epidermal cells of the root or rhizome.

3. The fungus during its whole life-course lives within the root cells of the host.

4. Nuclei of infected cells become much enlarged, showing an increased activity of cell protoplasm.

5. The living protoplasm of the root cells absorbs the protoplasm of the fungus. This is observed in roots that approach the period of decay.

6. The fungus is at first nourished by the cell protoplasm, which changes it so as to render it unable to grow outside of the root cell.

In regard to the mykorhiza of Ericaceæ, Frank comes to similar conclusions. His pupil Schlicht has found fungi in roots of the following families. Ranunculaceæ, Leguminosæ, Rosaceæ, Œnotheraceæ, Umbeliferæ, Geraniaceæ, Oxalidæ, Hypericaceæ, Violaceæ, Primulaceæ, Labiatæ, Boragineæ, Dipsaceæ, Valerianaceæ, Plantagineæ, Rubiaceæ, Smilaceæ, Compositæ, Gramineæ. The true nature of the *Rhizobia* in these numerous families is not known in most cases.

In regard to symbiosis of the Leguminosæ in the same article Frank comes to the following conclusions:

1. At least some of the Leguminosæ live in symbiotic relations with a fungus with which the plant becomes infected as soon as it begins to develop in normal soil.

2. This fungus has specific properties belonging to the Schizomycetes; it is the *Rhizobium leguminosarum.*

3. The fungus probably develops and multiplies to some extent in the soil.

4. The roots of the Leguminosæ have the power of attracting the fungus. This is probably due to some peculiar secretion.

5. The manner of infection is the same as described in 1890.

6. The "Bakteroiden" of 1890 are now considered true fungi. They are, however, much modified through the assimilation of cell protoplasm.

7. These modified fungi will not multiply outside of the vegetable cell.

8. A few normal fungi are always left over, which pass into the soil ready to infect other developing plants.

9. There is only one species of *Rhizobium.*

In comparing Frank's résumé of 1890 with that of 1891 the following differences are noted: the Bakteroiden are not albuminous differentiations of the mycoplasm, but they are considered to be true, much-altered *Rhizobia* and these modified *Rhizobia* cannot grow and multiply outside of the vegetable cell. He admits that in his former decision in favor of Bakteroiden he had been influenced by Brunchorst. Woronin in 1866 was the first who maintained that the Bakteroiden of Brunchorst were true bacteria. Indeed, Frank thought for a time that all the controversy about Bakteroiden being living organisms was due to Woronin. In the last year or two the strongest arguments are with Frank's latest decision (1891). M. Ward took the Bakteroiden to be the spores of a true hyphal fungus. Ericksson also took them for a spore or bacterioid buddings from true hyphæ.

The "Infectionsfäden" seem to be another cause of much controversy. Frank formerly likened them to the *Schinzia* (*Plasmodiophora*) *Alni* of Woronin and called them *Schinzia leguminosarum.* As will be seen from his conclusions of 1890 and 1891 he definitely states that they are not a fungus, but a production of the normal plant cells used for the purpose of infection. M. Ward took the Infektionsfäden for the real fungus of which the Bakteroiden were the spores. Prazmowski at first took them for plasmodia filled with small rod-like bodies. As soon as the plasmodium enters the root cells it surrounds the entire cell contents so that plasmodium and cell contents can not be distinguished. Later he changes his opinion and takes the Infektionsfäden for hyphæ-like tubes filled with bacteria. That is, the hyphæ-like tubes, if not identical with Frank's Infektionsfäden, at least have a similar function. Schroeter seems to be satisfied that the Infektionsfäden are true plasmodia made up of swarm spores of his *Phytomyxa leguminosarum.*

At present I shall not enter into any further discussions of existing controversies, but shall proceed with my own observations and resultant conclusions. In my observations I studied the *Rhizobia* as I found them in the various Leguminosæ. Frank and Beyerinck, so far as I can learn, made their principal observations on culture *Rhizobia.* These cultures are apt to lead to erroneous results for three reasons: First, because but little is at present known of their behavior outside of their host; second, because the same tubercle may contain a variety of *Rhizobia* and other bacteria, especially tubercles that have begun to break down—these would be liable to influence the culture formations; third, because of the well known fact that culture fluids greatly modify the appearance of bacteria. Frank seems to give no plausible reason why there should be but one species of *Rhizobium.* Frank and Beyerinck both admit that this one species occurs in a variety of forms, Y-shaped, oblong, curved, etc. In the examination of normal culture soil solution I found not only a variety of *Rhizobia*, but also a host of other bacteria, bacilli and micrococci. That all *Rhizobia* may have a similar function, that of assimilating free nitrogen, does not indicate that there must be but one species. Even since Frank maintains that the Bakteroiden are true, though modified, *Rhizobia* he seems to believe that there is but one species. In 1890 he declared that the micrococci-like *Rhizobia* were contained within the Bakteroiden which, according to his recent conclusions in regard to Bakteroiden, would be absurd or at least improbable.

Frank also seems to take it for granted that the plant or rather root has some attractive influence on the *Rhizobia.* He gives no cause for this assumption, nor do experiments bear him out. Capillarity, wind and water are the principal agents for the distribution of micro-organisms in soil. Air currents carry them from place to place on the surface of the soil. Rain, for instance, carries them deeper into the soil and brings them in contact with roots and rootlets; these with their root hairs and probably a sticky secretion, arrest them and infection takes place at suitable points. Capillarity will either carry them down or up, that depending upon the condition of the soil as to moisture. Hellriegel and Beyerinck have shown that when a leguminous plant was planted in sterilized soil and one side sprinkled with normal culture soil solution and the other with sterilized culture solution, the former developed tubercles while the latter did not. Now if the roots had any attractive influence they would certainly have drawn some of the *Rhizobia* from the infected to the non-infected side.

The purpose of my observations was primarily to settle the following questions:

(1). Do all the tubercles of the Leguminosæ contain one and the same micro-organism?

(2). Do all the micro-organisms undergo a modification of form in all infected Leguminosæ?

(3). Is the micro-organism a *Rhizobium* or a *Phytomyxa?*

In May, 1891, I examined the tubercles of *Trifolium pratense* and *T. repens* and noted the appearance of the contained *Rhizobia.* They were as shown in fig. 1, plate CXXX. Later, in June and July I examined tubercles of *Amphicarpaea comosa, Cassia Chamæcrista, Trifolium repens, T. pratense, Melilotus alba, Pha-*

seolus vulgaris, *P. pauciflorus*, *Lathyrus odoratus*, *Pisum sativum* and *Robinia Pseudacacia*. According to the statements of Frank I expected to find in each species examined the same kind of *Rhizobium*, though perhaps somewhat modified. This, however, was not the case. In *Melilotus alba*, *Trifolium repens*, *T. pratense* and *Lathyrus odoratus*, I found the cells of the infected area of tubercles entirely filled with the peculiar Y-shaped organisms, (the "Bakteroiden" of Brunchorst, bacteria of Woronin, spores or gemmules of Ward, etc.) (fig, 1, plate CXXX.) The same tubercles examined in June and July showed the same organisms, though much changed in appearance. They were larger, and the majority took on the Indian-club form. They had become fattened on the cell protoplasm (fig. 2, plate CXXX). The same tubercles examined in September and October showed the organisms still more modified. Some of them had become almost spherical, others oval-dumb-bell shaped, etc. In some the plant had begun to reabsorb the protoplasmic contents, as shown in *a*, fig. 3, plate CXXX. The same tubercles, examined late in October and beginning of November, showed that most of them had begun to break down, and the contained *Rhizobia* had their entire protoplasmic contents reabsorbed by the plant, leaving nothing but the empty, partially absorbed or decayed walls (fig. 3, plate CXXX). In these tubercles were also found a variety of bacteria spores and *Rhizobia* (?) that were not present while the tubercle was intact. Very likely these were foreign to the plant, and had been brought to and deposited in the partially destroyed tubercle by water currents and capillarity. Probably these foreign spores, bacteria and *Rhizobia* (?) were the organisms which Frank took to be the unmodified remnants and spores of the true *Rhizobium leguminosarum* left behind after the protoplasmic contents had been reabsorbed by the plant. Several culture attempts on gelatine in July proved to be failures. This confirms Frank's statements that the modified *Rhizobia* will not reproduce and develop outside of the host. Neither by the aid of various stains or the use of K H O solution was I enabled to detect the presence of spores. I am inclined to the belief that they multiply by direct division only.

In the examination of the tubercles of *Phaseolus pauciflorus* I found the cells of the infected area entirely filled with curved *Rhizobia*, resembling the comma bacillus of Koch. Staining with eosin or fuchsine brought into view a spore at either end. Their form was so constant and even that I could not bring myself to imagine that they were identical with the *Rhizobia* of *Melilotus alba*, for example. Furthermore they retained their constant form throughout the entire year. The *Rhizobia* of *Phaseolus vulgaris* were still different—they were straight, in form constant, in size quite variable. There were spherical spores, one at either end, rarely only one. The spores of the curved *Rhizobia* were hemispherical. The *Rhizobia* of *Pisum sativum* corresponded exactly with those of *Phaseolus vulgaris*, only that they were smaller. *Dalea alopecuroides*, *Robinia pseudacacia* and *Cassia Chamæcrista* contained a *Rhizobium* differing from any of the ones described above. It presented a knotted, irregular outline; generally three spores, sometimes one, rarely two. The *Rhizobia* of *Amphicarpæa comosa* differed from the one just described in that the spores were placed some distance from the ends. They were also somewhat smaller, as will be seen from the table of measurements. From these observations I felt satisfied that there was more than one species of *Rhizobium*, and that they did not all take part in that change of form so well marked in the first described species. The question might be raised whether the protoplasmic contents of the *Rhizobia* are in all cases reabsorbed by the plant or whether they, at least in some cases, simply die and disintegrate for want of food supply. It is known that in all cases the tubercles are destroyed towards the close of vegetation, thus liberating the remaining *Rhizobia*.

As already stated, Schroeter took the Infektionsfäden to be true plasmodia of his *Phytomyxa leguminosarum*,=Frank's *Rhizobium*. Now the Infektionsfäden are very prominent in *Trifolium pratense* but its *Rhizobia* contain no spore whatever so far as I have been able to make out, so the Infektionsfäden cannot be the plasmodium of the *Rhizobium* of white clover. Furthermore the Infektionsfäden are absent in many species infected with the *Rhizobia* or *Phytomyxa*. So instead of placing the *Rhizobia* with *Myxomycetes*, according to Schroeter, it is better to place them with the Schizomycetes, according to Frank; because their composition, development, methods of reproduction and general behavior correspond to those of the Schizomycetes.

Frank claims to have seen the spores of *Rhizobium* within the Infektionsfäden. I have been unable to find anything in them except a granular, spongy (*schaumniges*) appearance when treated with K H O solution. These Infektionsfäden are not present in all tubercles, for instance, those of *Phaseolus vulgaris*, *Pisum sativum*, *Robinia Pseudacacia*. Nor are the "infecting strands" always absent where Frank thinks they are not needed. I have found them in young *Phaseolus vulgaris;* have traced them in tissues opposite the tubercle, or some distance from the tubercle, having no connection with it. Nor do these "strands" generally originate in a root hair, but more often from the epidermal layer of root cells, where they begin as a small spherical protoplasmic lump, as shown at *a*, fig. 1, plate CXXIX. These infecting strands seem to have no outer wall; they are nonseptate, branching, interlacing, passing directly through the protoplasm and wall. Their protoplasm is of a different consistency from that of either the cell or *Rhizobia*. It is more resistant toward chemicals and staining fluids. It remains after the protoplasm of cell and *Rhizobia* have been used up. It is more than likely that these Infektionsfäden have nothing to do with the *Rhizobia;* because, they are not present in all cases, and when present, are not always in or near tubercles. I could detect no spores in them. They are present in tubercles of *Trifolium repens*, whose *Rhizobia* have no spores. I found them in young *Phaseolus vulgaris*, where Frank says they are not needed. Since infection in some cases takes place without the "strands," may it not do so in all cases?

The form of the tubercle seem to have nothing to do with the kind of infecting *Rhizobia*. In *Dalea alopecuroides* and *Lathyrus odoratus*, for instance, are found similar tubercles as to form and size, but they contain distinct *Rhizobia*. I did not notice much regularity as to the position and distribution of tubercles. They are usually more numerous near the surface of the ground. They may be found on the main root or on its branches. In *Trifolium repens* and *T. pratense* they seem to form more often where rootlets branch. The root hairs on tubercles are usually few and dwarfed, as shown in fig. 1, plate CXXIX.

The histology of the tubercle may be briefly considered as follows:—The tubercle consists of a collection of abnormally large parenchyma cells whose protoplasm and nuclei are much modified: The nuclei are much enlarged, chromatine prominent, *Rhizobia* imbedded in the cell protoplasm, all division very active, thus producing new and infected cells. Beginning on the outside in examining a section of tubercle, the following layers may be described. Epidermal layer, no root cap; non-infected area one, two or more layers thick; immediately below that is the starch-bearing zone entirely surrounding the infected area, and continuous with the starch-bearing layer of the vascular bundle. The remainder of the tubercle is the infected area filled with *Rhizobia* and some starch granules. No starch is present in cells entirely filled with the *Rhizobia.* The plant no doubt requires the protoplasm of the *Rhizobia* from which to build starch. Between the infected and non-infected area, and including the starch-bearing zone, the cells are partially filled with *Rhizobia*, (see fig. 1, plate CXXIX).

Tubercles had been noticed by some of the older botanists. Malphighi took them for animal galls; Treviranus (Bot. Zeit., 1853) for adventitious buds; DeCandolle for pathological growths; Clos for lenticels. Their real nature was not suspected.

SYSTEM OF "RHIZOBIA."

SCHIZOMYCETES.

MYCODOMATIÆ.

Rhizobia developing and living in root tubercles of variable size and form. Tubercles always on main root or its branches, and decaying at the close of vegetation.

Rhizobium mutabile, n. sp.

Syn.: *Bakteria*, Woronin.
Bakteroiden, Brunchorst.
Spores or gemmules, Ward.
Bacillus radicicola, Beyerinck in part.

This species was first discovered and probably the most common. It may be that this species, above all others, has the power to assimilate free nitrogen. Experiments will be necessary to determine that point. As is seen from the synonyms, some authorities took this species for an organism and others did not. Woronin was the first to place it among living organism, the bacteria. Beyerinck believed that they were modified bacilli. Ward maintained that they were the budded-off gemmules or spores of a true hyphal fungus, as already explained. Brunchorst, and also Frank, said they were bacterioid collections of albuminios substances formed from the cell protoplasm. Recently Frank claims that they are true *Rhizobia*, because plasmolysis causes them to contract like living protoplasm.

I have found this species symbiotic with *Trifolium pratense* and *T. repens*, *Melilotus alba* and *Lathyrus odoratus*. It is at once recognized by its size and the varying form it takes on during the vegetation period. It was impossible for me to detect the presence of spores during any time of its existence. It very likely multiplies by division only. The tubercles produced are oblong or irregular, varying in size from that of a pin head to that of a small pea; sometimes they are collected in large grape-like bunches, as in *Melilotus alba*. The modified organisms do not develop upon gelatine or agar-agar cultures. They are surrounded by a gelatinous zone.

Rhizobium curvum, n. s.

Syn.: *Rhizobium leguminosarum*, Frank.
Phytomyxa leguminosarum, Schroeter.
Cladochytrium leguminosarum, Vuillemin.
Bacillus radicicola, Beyerinck.
Pasteuriaciæ, Laurent.
} in part.

Symbiotic with *Phaseolus pauciflorus*. Cells curved, resembling the comma bacillus of Koch. One hemispherical spore at each end, rarely more. Size quite uniform, and form constant during entire vegetative period. Gelatinous zone present. Tubercles spherical, varying in size from that of a pea to that of a small hazel nut.

Rhizobium Frankii, n. s., var. *majus*, n. v.

Syn.: Same as preceding.

Symbiotic with *Phaseolus vulgaris*. Cells straight, generally two or three times as long as broad. Size variable. Two spherical spores, one at either end, sometimes one, rarely none. Spores larger than in the preceding. External gelatinous coat. Tubercles small, spherical, comparatively few in number.

Rhizobium Frankii, var. *minus*, n. s.

Syn.: Same as preceding.

Symbiotic with *Pisum sativum.* It is smaller; otherwise like the preceding.

Rhizobium nodosum, n. s.

Syn.: Same as preceding.

Symbiotic with *Dalea alopecuroides*, *Robinia Pseudacacia* and *Cassia Chamœcrista.* Cells of an irregular, knotted appearance. Protoplasmic contents often collected in lumps. Generally one or three, rarely two, spores situated at the ends, with one somewhere near the middle. Sometimes an encapsuled chain of spores. Gelatinous zone present. Tubercles round, oblong or irregular, varying in size from that of a morphine pill to a large pea.

Rhizobium dubium, n. s.

Syn.: Same as preceding.

Symbiotic with *Amphicarpœa comosa.* General description corresponds with the preceding, only that it is somewhat smaller and the spores are not situated in contact with the end walls as in all the preceding; but small distances from them. Tubercles spherical, about half as large as a pea. Considerable starch in tubercles.

For better understanding of the above described species consult table of measurements and plate CXXX.

TABLE OF MEASUREMENTS.

	LENGTH.	WIDTH.
	μ	μ
Rhizobium mutabile in May,	3-4	.8
" " " July,	6.4	1
" " " September,	5-8	2-3.5
" *curvum*,	1.9	.6
" *Frankii*, var. *majus*,	.8-3	.6
" " " *minus*,	.6-1.4	.5
" *nodosum*	1.6-3.5	.8
" *dubium*	1.6-2.4	.6

Settled Facts.

1. That certain fungi are symbiotic in and on roots of certain plants.

2. Some of these fungi are purely parasitic, while others have the power of assimilating for the use of the plant free nitrogen of the air.

3. Plants can exist without these fungi, but as a rule thrive better with them.

4. At the close of vegetation, and also on other special occasions, the plant reabsorbs the protoplasm of the fungi.

5. The Infektionsfäden are not hyphæ of which the Bakteroiden are the spores or gemmules.

Probable Facts.

1. That there are at least several species of *Rhizobium.*

2. That the Infektionsfäden have nothing to do with the *Rhizobia* under consideration.

3. That the *Rhizobia* belong to the Schizomycetes.

4. That *Rhizobium mutabile* has no spores.

5. That the Infektionsfäden are true hyphal fungi allied to *Schinzia Alni.*

Improbabilities.

1. That the Infektionsfäden are plasmodia.

2. That the *Bakteroiden* are not living organisms.

3. That the plant exerts any attractive influence upon the *Rhizobia.*

4. That some plants cannot exist without the symbiotic fungus.

The researches of which this paper is a partial record, were undertaken in 1890 and 1891, in the Laboratories of Botany, at the University of Minnesota, in Minneapolis.

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EXPLANATION OF PLATES.

PLATE CXXIX.

Fig. 1. Longitudinal section of *Trifolium repens* rootlet with a developing tubercle; stained with water-eosin. *a*, *Infektionsfäden* of Frank, *hyphæ* of Ward and Vuillemin, *plasmodia* of Prazmowski (?) and Schroeter. One of them is opposite the tubercle, having no connection with it. One originates in a root-hair, *h*,

They are probably true hyphal fungi closely related to the *Schinzia Alni* of Woronin. *c*. Infected area. Only cell walls and the contained *Rhizobia* are shown. *d*, Dwarfed root-hairs on tubercle. *e*, Normal root-hairs, one infected with *Rhizobia*. *f*. Vascular bundle. *g*, Starch-bearing area surrounding entire infected area.

Fig. 2. Portion of infected area somewhat more magnified showing distribution of *Infektionsfäden*, Nuclei and cell protoplasm are not shown. *a*. Cell filled with *Rhizobia*. *d*, Infecting strands. *b*, Infektionsfäden are somewhat expanded near cell wall. *e*, *Haustoria* of Kny. Expanded knobbed extension from the strands.

Fig. 3. Rootlet of *Melilotus alba*. *a*, Developing tubercles. *b*, Single tubercles. *c*, Grape-like bunches of tubercles, slightly magnified.

Fig. 4. Rootlet of *Amphicarpæa comosa* with spherical tubercles.

Fig. 5. Rootlet of *Dalea alopecuroides*. Tubercles resembling those of *Melilotus alba* and *Trifolium pratense* and *T. repens* though somewhat larger.

Fig. 6. Portion of infected arc of *Trifolium repens* showing nuclei treated with KHO solution, and cell protoplasm (mycoplasm). *a*, Nucleus enlarged. *b*, Cell protoplasm (mycoplasm). partially used by the plant containing modified *Rhizobium mutabile*. *c*, *Infektionsfäden*. They seem to be entirely independent of cell nuclei and mycoplasm. *d*, *Haustoria* of Kny. They do not appear granular while the strands do.

PLATE CXXX.

Fig. 1. *Rhizobium mutabile* as it appears in May, or the time of infection.

Fig. 2. The same in June and July.

Fig. 3. The same in September and October. *a*, A *Rhizobium* from which the plant has begun to reabsorb the contents.

Fig. 4. The same in October and November. a, Partially emptied *Rhizobia*. *b*, Entirely empty, nothing remaining but the partially destroyed walls. *c*, Normal forms which either had not undergone any change in the cell or had just gained access to the tubercle through its partially decayed distal end.

Fig. 5. *Rhizobium curvum*.

Fig 6. *Rhizobium Frankii*, var. *majus*.

Fig. 7. *Rhizobium Frankii*, var. *minus*.

Fig. 8. *Rhizobium nodosum*.

Fig. 9. *Rhizobium dubium*.

New or Noteworthy North American Phanerogams.—VI.

By N. L. Britton.

Ranunculus arvensis, L., which has been noticed on ballast about the eastern seaports for many years appears to be spreading. It was found by Mr. Wm. H. Rudkin at Tom's River, N. J., in 1884, and now Mr. Geo. V. Nash sends it from the vicinity of Clifton, Passaic Co., N. J.

Cardamine Pennsylvanica, Muhl. in Willd. Sp. Pl. iii. 486 (1800).

It has been a frequent topic of remark among American botanists that our *Cardamine hirsuta* is a glabrous plant. I have been interested for several years in accumulating a large number of specimens of the forms which have been referred to *C. hirsuta* and am convinced that the typical plant is rare in America, as is indicated in the sixth edition of Gray's Manual. Our common marsh and ditch plant differs from *C. hirsuta* in being glabrous or rarely with a few hairs on the petioles or leaf-margins, while all the European specimens of this species that I have seen are more or less pubescent on the stems, the upper surface of the leaf-segments or the petioles. *C. Pennsylvanica* is much larger and more leafy, being often two feet high; the leaves of *hirsuta* being mainly radical; the leaf-segments of *Pennsylvanica* are larger, more generally oblong or ovate, narrowed rather than rounded at the base, as is the case with those of *hirsuta*, and have a decided tendency to be decurrent on the rachis, while those of the European plant are nearly uniformly distinct and stalked; the leaf-segments of *Pennsylvanica* are also thinner and more lobed than those of *hirsuta*; the fruiting pedicels of *Pennsylvanica* are always somewhat spreading and sometimes conspicuously so, while those of *hirsuta* are nearly or quite erect and the pods appressed.

I have but a single specimen of true *C. hirsuta* from North America, collected by John K. Small, May 2, 1891, along the Susquehanna River, north of Wrightsville, York County, Penn. The question of its distribution will be an interesting one. Is it Northern or Alleghenian? Or perhaps introduced from Europe?

Cardamine parviflora, L. Sp. Pl. Ed. 2, 914 (1763).

In the "Transactions of the New York Academy of Sciences" ix. 8 (1889), I have maintained that the plant described by Dr. Gray (Man. Ed. 5, 67), as *Cardamine hirsuta*, var. *sylvatica*, is specifically distinct from *C. hirsuta*, and referred it to *C. flexuosa*, With., a European plant. I am satisfied now, as I was then, that it is distinct from *C. hirsuta*, but after a study of a long series of European specimens at Kew and the British Museum, I am equally satisfied that it is not *C. flexuosa*, but is *C. parviflora*, of which I have seen the original specimen in the Linnæan Herbarium. The equivalency of our plant with the European is noted by Watson and Coulter (Gray, Man. Ed. 6, 65). This species is evidently of northern range, occurring from Virginia and Pennsylvania to Quebec (according to Macoun) and Western Ontario.

As I now understand these plants there is still a third eastern species, the *Cardamine Virginica* of Michaux. (Fl. Bor. Am. ii. 29, 1803), and *C. hirsuta* var. *Virginica*, T. and G. Fl. N. A. i. 85, but not *C. Virginica*, L. This grows in sandy, open, moist soil along the Atlantic coast. It is very much branched at the base, forming numerous, ascending or erect leafy stems six inches to a foot high, the leaves nearly erect and divided into numerous linear or linear-oblong, obtuse or obtusish segments, those of the lower leaves broader than those of the upper, as in all this group. The fruiting pedicels are ascending and the pods strictly erect. The plant is apparently glabrous throughout. I have it from Middletown, Conn., "on sandy fields subject to be overflowed by the rivers" (J. Barratt), Huckleberry Island, Long Island Sound, (Mrs. Britton), and collected it myself on April 16th of this year at Portsmouth, Va., where it was in full fruit and flower, and impressed me by its very different appearance from any form with which I was familiar. As Michaux's name for the plant is preoccupied by the Linnæan, I propose for it

✓ CARDAMINE ARENICOLA.

Arabis Virginica (L.)

Cardamine Virginica, L. Sp. Pl. 656 (1753) not of Herbarium.

Cardamine Ludoviciana, Hook. Journ. Bot. i. 191 (1834).

Arabis Ludoviciana, Meyer Index Sem. Petr. ix. 60 (1843).

Arabis Virginica, Branner and Coville, Rep. Geol. Surv. Ark. for 1888, 165 (1891).

Messrs Branner and Coville, at the place above cited, express themselves as uncertain of the applicability of the Linnæan name to this species. They have taken it up correctly, however, although it has had a curious history. The specimen preserved under the name *Cardamine Virginica* in the Linnæan Herbarium is *Sisymbrium asperum*, L. of Southern Europe, which bears a wonderful resemblance to the plant of the Southern United States, readily distinguishable, however, by its glandular-roughened siliques, those of the our plant being perfectly glabrous. The foliage of the two species is practically identical. It is perfectly evident, however, from his description that Linnæus had only the American plant in mind, and this is proved by the types preserved at the British Museum of Natural History. I found no specimen of his *Sisymbrium asperum* except the one labelled *Cardamine Virginica*, in the Linnæan Herbarium, and it is clear that this one has been accidently fastened down to the wrong sheet.

AGRIMONIA MOLLIS (T. and G.).

Agrimonia Eupatoria, var. *mollis*, T. and G. Fl. N. A. i. 431 (1840).

Agrimonia pubescens, Wallr. Beitr. Bot. i. 45, t. 1. f. 7. (1842) ex descr.

This is another plant of this genus which I am sure deserves specific rank. I pointed out the characters of Wallroth's *A. microcarpa* in the BULLETIN, xviii. 367. The present plant, recognized as a variety by Torrey and Gray, has a slender canescent or pubescent stem, five to nine principal leaflets which are oblong or obovate, obtuse and equally dentate, small flowers and turbinate fruit, borne on erect, short pedicels and a glabrous, ribbed calyx 2 mm. high in fruit.

We have it from Red River (Dr. Pitcher, the type specimen of the variety), Riverdale, N. Y. (Bicknell), Little Neck, Long Island (Schrenk), Heiligs Mill, N. C. (Small and Heller, No. 321). The North Carolina specimen has tuberous thickened roots, as especially remarked by the collectors, and these are also shown by Mr. Bicknell's plants from Riverdale.

FRAGARIA AMERICANA (Porter).

F. vesca, var. *β*, Torr. and Gray, Fl. N. A. i. 148 (1838).
F. vesca, var. *Americana*, Porter, Bull. Torr. Club, xvii. 15 (1890).

The characters of this plant have been well indicated by Prof. Porter. It differs from the European *F. vesca* in its thin, deeply and sharply dentate leaflets, which become glabrate in age, and superficial achenes which are scarcely or not at all imbedded in the ovoid fruit. I have seen no form of the European plant which very closely resembles it. It is an Appalachian and northern species, extending west to Michigan and south to Virginia, probably further both to the south and west. The introduced *F. vesca*, which occurs rather sparingly in the Eastern States, may usually be distinguished from *F. Virginiana* by a character not alluded to in recent text-books, but mentioned by Dr. Sturtevant in Mem. Torr. Club i. 183, 184; this is that in *F. vesca* the fruit is borne above the leaves, while in *F. Virginiana* the leaves rise above the fruit.

Fragaria Virginiana, Mill. Gard. Dict. Ed. 8, No. 2 (1768). Miller is the author of the species rather than Duchesne, to whom it is usually ascribed, the date of Duchesne's publication in the second volume of Lamarck's Encyclopedia being 1786; Miller's type is preserved in the Herbarium of the British Museum of Natural History.

Fragaria Canadensis, Michx. Fl. Bor. Am. i. 299 (1803). This plant, referred by recent authors to *F. Virginiana*, appears to me to be a distinct species. It is a slender plant, the hairs on the flowering scape appressed as in *F. Virginiana*, but the leaflets are much narrower, oblong or the middle one obovate and cuneate at the base, all obtuse, rather sparingly and not deeply toothed, averaging not more than 3 cm. long and 1.5 cm. wide, quite glabrous on the upper surface even when young, pale and more or less appressed, pubescent beneath; the flowers are few, about 1.5 cm., broad and slender pedicelled. I have not seen the fruit.

Michaux's plant, preserved in the Paris Herbarium, came from Lake Mistissini. We have specimens collected by Dr. Richardson in Arctic America, and by Kennicott on Elk River. The species is thus indicated as high northern in distribution.

Valeriana pauciflora, Michx. Fl. Bor. Am. i. 1803.

The pappus of this species is not described so far as I am able to ascertain. One of the essential characters of *Valeriana*, as the genus is recognized by recent authors, is the development of the calyx-teeth into plumose bristles. In *V. pauciflora*, however, I find no indication that this is the case, even in fruit which seems to be perfectly mature, which I have from Professor Porter, collected by him at Millersburg, Penn., in 1865. In this the calyx-teeth remain short and inrolled, are slightly ciliate, and about 0.5 mm. long. In the related *V. Arizonica*, A. Gray, the fruit of which was not known to the describer at all events at the time of description, but which I have from a specimen collected by Dr. Rusby on Bill Williams Mountain, Arizona, in 1883, the similar short inrolled calyx-teeth occur. Now both these species differ from all other Valerians that I have at hand to examine by their large, slender, elongated corollas, resembling in this character the European genus *Centranthus*. They do not agree with *Centranthus*, however, in other important particulars, this genus having an elongated pappus and only one stamen.

I am printing this note to call attention to the fruit of *V. pauciflora*, in the hope that some one may be able to examine it when perfectly mature, and to determine whether it ever developes the copious pappus of other species.

Stevia ovata, Raf. New Fl. N. A. iv. 73 (1836).

A specimen of this plant, which Rafinesque says was collected by Walton in "Texas and Arkanzas," is preserved in the Columbia College Herbarium, with Rafinesque's own label. It is quite the same as other specimens labelled *Stevia ovata* received from Meisner and grown in the Basel garden, and from the Liverpool Botanic Garden sent to Dr. Torrey by Mr. Stead, collected in 1820. Whether or not these specimens are all the same as *S. ovata*, Lag. Nov. Gen. et Sp. 27, which Mr. Hemsley records only from South Mexico, I have no means of ascertaining other than the description. The locality cited by Rafinesque may be wrong, but it is worth while to record that his specimen is preserved.

ASTER CORDIFOLUS, L. var. INCISUS, n. var.

Leaves all lanceolate, glabrous, sharply serrate, or the lower incised, none of them cordate at base. Pocono Mountain, Penn. (Moser, 1832); near Riverdale, N. Y. (Bicknell, 1891).

Dr. Gray alludes to Moser's Pocono specimen in the Synoptical Flora as an extreme form of *A. cordifolius*. This plant appears to me worthy of varietal rank. It is nearest var. *lanceolatus*, Porter, BULLETIN, xvi. 68.

POLEMONIUM VAN-BRUNTIÆ, n. sp. (Plate CXXXI).

Rootstock stout, horizontal. Stems erect, glabrous below, somewhat glandular-pubescent above, 6-8 dm. high, leafy to the top; leaflets of the lower leaves 15-19, short-petioluled, or sessile, ovate or lanceolate, 1½-3½ cm. long, 5-15 mm. wide, those of the upper ones fewer; cymose clusters panicled or solitary, rather loosely 3-8 flowered; flowers bluish-purple, 15-20 mm. broad; petals rounded; calyx 5-lobed to about the middle, much enlarged in fruit, the lobes acute or acutish; stamens exserted; ovules 3-4 in each cell of the ovary.

In cold, wet places, New York—Herkimer Co. (Clinton); Delaware Co. (Gilbert); Schoharie Co. (Howe); Ulster Co., Balsam Lake (Mrs. Van Brunt); Alder Lake (Rusby); Chenango Co., Preston and McDonough (Coville, BULLETIN, xii. 53); Tioga Co., near Appalachin (C. D. Fretz, BULLETIN, ix. 72).

Vermont—near Ripton (Brainerd, BULLETIN, viii. 6).

New Jersey—Warren Co., swamp near Washington (Garber, Porter).

Maryland—near Oakdale (J. Donnell Smith).

This fine species has always been referred to the European *P. cæruleum*, L., from which it differs in its horizontal stout rootstocks, more leafy stem, exserted stamens, rounded (not mucronulate) petals, accrescent calyx which becomes twice or three times the size of that of *P. cæruleum*, broader and fewer leaflets, and fewer ovules. I take pleasure in dedicating it to the lady who has supplied such fine and numerous specimens by means of which the marked differences between it and the European plant may be pointed out.

The Rocky Mountain plant referred to *P. cœruleum*, but well separated by Professor Greene (Pittonia, ii. 75), as *P. occidentale*, has slender rootstocks, the upper part of the stem viscid pubescent, narrower, lanceolate leaflets and stamens only the length of the corolla, the fruiting calyx not nearly as large, and its lobes obtuse or obtusish. As pointed out by him, the subterranean parts of the true *P. cœruleum* are widely different from either of the American species. He supposes that the Appalachian plant is the same as the Colorado species, but Mrs. Van Brunt's specimens, taken with the others that I have seen, render that view untenable.

The foliage of *P. Van-Bruntiæ* bears considerable resemblance to that of *P. reptans*, L., but that plant is well marked by its diffuse habit, flowers half the size, stamens included, and calyx lobed only about one-third of its length, the lobes obtuse.

PHLOX KELSEYI, n. sp.

Many-stemmed from a woody root, the stems spreading, creeping or ascending, sometimes 20 cm. long, glabrous or slightly pubescent above, very leafy. Leaves sessile, oblong or linear-oblong, glabrous or nearly so on both sides, 5-15 mm. long, 2-4 mm. wide, thick, rigid, the apex mucronately tipped with a short spine, the margins revolute, ciliate; upper leaves narrower and longer than the lower; flowers sessile or short-peduncled, the peduncles and calyx somewhat glandular-pubescent or glabrous; calyx-teeth subulate, as long as or longer than the tube; corolla tube somewhat exceeding the calyx-lobes; corolla-limb, about 1.5 cm. broad, bright blue or lilac, its lobes obovate-cuneate, rounded.

Helena, Mont. (F. D. Kelsey); Madison Co., Mont. (F. Tweedy, No. 154); Ft. Buford, N. Dakota (V. Havard); Black Hills (Jenney).

This plant, which I confidently propose as an undescribed species, is apparently nearest to *P. longifolia*, Nutt., var. *Stansburyi* (Torr.), forma *brevifolia*, A. Gray, Proc. Amer. Acad. viii. 225, changed to sub-var. *brevifolia*, A. Gray, in the botany of the 40th parallel and to var. *brevifolia*, A. Gray in the Synoptical Flora of North America. From the remarks at the place of original publication Dr. Gray evidently intended *breviflora* to apply to the shorter-leaved forms of the viscidly glandular southwestern *P. longifolia*, var. *Stansburyi*, such as illustrated by No. 896 of the 40th parallel collection, and hence *brevifolia* is not to be regarded as a synonym of the species here proposed, although Dr. Gray subsequently so-named Mr. Jenney's Black Hills specimens here referred to *P. Kelseyi.*

The status of *Stansburyi* as a variety of *P. longifolia* does not appear to me to be satisfactory. *P. longifolia* is a very narrow-leaved plant, almost glabrous throughout, and is of northwestern range. *Stansburyi* is viscidly glandular, with broader leaves and of southwestern distribution. Types of both are in our herbarium.

I am indebted to Dr. B. L. Robinson for a comparison of my specimens with those in the Gray herbarium.

CYPERUS DIANDRUS, Torr., var. ELONGATUS n. var.

Spikelets linear, acute, slender, 2-2.5 cm. long; scales, or some of them, brown-margined as in var. *castaneus.*

This plant was collected in 1865 at Summit, N. J., by Mr. Wm. H. Leggett, and again last year by Mr. E. P. Bicknell at Van Cortlandt, N. Y. Its much elongated spikelets give it a very different appearance from the var. *castaneus*, with which it grew at both localities.

Eriocaulon bilobatum, n. sp.

BY THOMAS MORONG.

Stems numerous, 2-2½ inches high, very slender, about 5-striate. Leaves acuminate, pellucid, 3-5-nerved, spreading, ½-¾ inch long. Sheaths usually bilobed at the apex, loose, somewhat longer than the leaves. Heads ovoid, 1-1½ lines high, very glabrous and dark-colored. Involucral scales ovate, obtuse, entire, fuliginous. Bracts as long as the flowers, elliptical, glabrous. Segments of the perianth 6: of the fertile flower, thread-like, glabrous or slightly woolly, greenish or fuscous in color, loosely cellular in structure, about ½ line high, the tube white; sterile flowers in the apex of the head about the size of the fertile, but the perianth segments broader, lanceolate in shape, glabrous and fuscous, often reduced to 2 in both the outer and inner perianth. Stamens 6, anthers mostly white. Receptacle smooth. Seeds oval, about $\frac{1}{75}$ of an inch in length, the surface covered with crested ridges or imperfect recticulations.

Pringle, No. 3,855, distributed under the name *E. Jaliscanum*, S. Wats., from which species it differs in several marked particulars. *E. Jaliscanum* has mostly depressed-globose heads, the scales and bracts broader, pale or white, the perianth segments white, linear-lanceolate, and both bracts and segments white-bearded; seeds sculptured with ten or twelve rows of oblong, rectangular or hexagonal reticulations, the raised lines of which appear knobbed or toothed.

Collected by Mr. Pringle Oct., 1891, in wet places near Guadalajara, Mexico, the same locality at which *E. Jaliscanum* was obtained the previous year, and brought to my notice by Pres. Ezra Brainerd of Middlebury College.

Programme of the International Botanical Congress of Genoa, 1892.

Sunday, Sept. 4, 8 p. m.—Reception of Foreign Botanists (Municipal Hall).

Monday, Sept. 5, 9:30 a. m.—Inauguration of the Congress (Great Hall of the University). 2 p. m.—First Scientific Sitting (Great Hall).

Tuesday, Sept. 6, 10 a. m.—Inauguration of the Hanbury Institute (Botanical Garden). 2 p. m.—Second Scientific Sitting (Great Hall).

Wednesday, Sept. 7, 9 a. m.—Third Scientific Sitting (Great Hall). 2 p. m.—Visit to the Exhibition and to the town.

Thursday, Sept. 8, 8. a. m.—Trip by sea to Portofino—thence by carriage to S. Margherita, Rapallo, Ruta and Recco, returning by steamer.

Friday, Sept. 9, 9 a. m.—Fourth Scientific Sitting (Great Hall). 2 p. m. Fifth (and last) Scientific Sitting (Great Hall).

Saturday, Sept. 10, 7 a. m.—Excursion to Ventimiglia and to Mortola. Visit to Mr. Th. Hanbury's Garden.

Sunday, Sept. 11,—Excursion from Ventimiglia to the Col di Tenda.

DIRECTIONS AND SUGGESTIONS.

The International Botanical Congress will be held at Genoa between the 4th and 11th September, 1892. The duration of the

Congress may be prolonged, should it be deemed advisable, in consequence of the abundance of subjects for discussion or for other reasons approved by the Assembly.

Anybody occupied in botanical study or cultivating any special branch of botany will be entitled to take part in the Congress.

To be inscribed as a member of the Congress, it will be necessary to sign and forward to the Secretary of the organizing Committee (Prof. O. Penzig, R. Università, Genoa) the printed form distributed for this purpose by the Committee, or to inscribe oneself during the period of the Congress in a book provided for the purpose.

Every member of Congress will pay a fee of ten francs on receiving his admission card. The members of the Italian Botanical Society will be exempt from this fee.

The admission cards (or season tickets) give access to all the sittings of the Congress, the right to take part in the excursions and entertainments proposed, etc., and also admittance to the Museums, Libraries and Collections which at that period will be open to the members of the Congress. As the presentation of these cards will frequently be necessary, members are therefore recommended to carry them constantly with them during the whole time of the Congress.

All the sittings of the Congress will be held in public, but the right to speak and take active part in the discussions and voting will be reserved for members only.

The official language of the Congress will be in Italian, but it will be free to everybody when speaking or in discussions to use whatever language he may be most familiar with.

No particular subdivisions of the various branches of Botany will be instituted, with separate meetings for each, unless the number of members present and the abundance of subjects to be discussed should render such divisions necessary.

It was not considered advisable to fix any special subjects for discussion, but it is as well to mention from the first that the Reform of Botanical Nomenclature will be treated in accordance with O. Kuntze's recent book, and that lectures are already announced on the theories of F. Delpino respecting Phyllotaxis and Pseudanthia.

The subjects to be proposed for discussion during the scientific sittings must be notified to the Secretary of the Committee not later than the 15th of August, 1892. The subjects notified after that date will only be admitted, if, after exhausting all the other subjects regularly notified, sufficient time should still remain for their discussion.

After the introduction of each subject for scientific argument, the discussion of the same will be in accordance with the usual parliamentary rules.

After the Congress, the Committee will print a brief account of the meetings, and will publish also the originial memoirs presented to the Congress. Every member of the Congress will be entitled gratis to a copy of these "Proceedings of the Botanical Congress of 1892."

To insure the prompt publication of the Proceedings it is indispensible that the authors of each memoir should hand in their manuscripts, ready for printing, before the closing of the Congress, or at least within the month of September, 1892. The memoirs will appear in the volume in the same order as the manuscripts are delivered. After September no more manuscripts can be accepted. The only memoirs which will be included in the Proceedings of the Congress will be those drawn up by members of the Congress, and of which at least a summary shall have been laid before one of the scientific meetings.

The authors of the memoirs printed in the Preceedings of the Congress will each receive gratis fifty separate copies of their writings. Should they require a greater number of copies, they will have to pay (direct to the printer) the cost of paper and printing of the same, according to the special tariff establised by the Committee with the printer. The memoirs may be written in any language which does not require printing in other than Roman type. Any illustrative plates accompanying the manuscripts will be published in proportion to the funds at the disposal of the Congress. Authors must attend themselves to the correction of the proofs of their own work and must assume the responsibility for the same.

The seat of the Congress will be in the palace of the Royal University of Genoa (Via Balbi) where all the meetings will be held and where will be found the receiving office (for the delivery of admission tickets, incriptions, etc.), the meeting-room of the Committee, the writing-rooms, buffet, post office, telephone, etc., reserved for members of the Congress.

Arrangements have been made with the Italian and foreign railway companies and also with the chief steam navigation companies to obtain the usual reduction of fares for the members of the Congress. It is urgently requested that the printed forms of assent may be returned to the Committee not later than July 1, 1892, so that the drawing up and forwarding of the relative papers may be carried out in good time.

An office where information concerning lodgings will be obtainable will be opened at the Municipality of Genoa.

Signed for the Committee, PROF. O. PENZIG, *Secretary.*

Botanical Notes.

Note on some Characeæ. The Characeæ sent from the Department of Agriculture, collected in the Sand Coulee of Montana by Mr. Williams, were determined by me some time ago, as stated in BULLETIN, vol. xviii. p. 194. Later Characeæ from Crater Lake, on Mount Agassiz, caused me to review more critically the above collection of Mr. Williams, and I find that the plants named *Nitella opaca* occur also in Crater Lake, and differ from *N. opaca* so decidedly as to form a new species which I have named *N Montanæ.* A description and illustration are in preparation, with a revision of the "opaca" section of *Nitella*, giving us two new allied species, namely, *N. Temiscouatæ* and *N. Montanæ.*

Chara evoluta, Allen, from British America, is probably identical with *C. Altaica*, A. Br. T. F. ALLEN.

The editor of "La Notarisia" requests all those who are interested in the study of Algæ, to send him a copy, (or, if possible, two,) of such writings as they may publish from time to time, it being his intention to have them reviewed in his publication. They will receive in return a copy of "La Notarisia" containing the review, or a reprint of the same. "La Notarisia" publishes all "oblata and desiderata" and any other communications that may be of interest to algologists.

All communications should be addressed to Dr. David Levi-Morenos, Piscina San Samuele, 3422, Venezia, Italy.

Index to Recent Literature Relating to American Botany.

Additions to the Catalogue of San Francisco Plants. Katharine Brandegee (Zoë, iii. 49, 50).

Notes on twenty species additional to the list published last year.

American Species of the Genus Anemone and the Genera which have been referred to it. N. L. Britton. (Annals N. Y. Acad. Sci. vi. 215-238; Contrib. Herb. Col. Coll. No. 23).

The six genera *Pulsatilla*, *Anemone*, *Hepatica*, *Capethia*, *Barneoudia* and *Syndesmon* (*Anemonella*), included by recent authors in *Anemone* are maintained as distinct. *A. patens*, var. *Nuttalliana*, A. Gray, is taken up under the name *Pulsatilla hirsutissima* (Pursh); *Anemone decapetala*, Ard. (1764) is *A. heterophylla*, Nutt. (1838); *A. sphenophylla*, Pœpp., is the southwestern Rocky Mountain plant hitherto referred to *A. decapetala*, L.; *A. Tetonensis*, Porter, is a new species from Idaho; *A. Lyallii*, from the Northwest, *A. Peruviana*, from Peru, and *A. Hemsleyi*, from Mexico, are also described as new; *A. nudicaulis*, A. Gray, from Lake Superior, proves to be *Ranunculus Lapponicus*, L. *Capethia* (anagram of *Hepatica*) is the generic name proposed for two plants of the higher Andes. *Barneoudia Balliana* is a new species from the Argentine Republic.

Archegonium and Apical Growth of the Stem in Tsuga Canadensis and Pinus sylvestris—On the. D. M. Mottier (Bot. Gaz. xvii. 141-143; one plate).

Asclepias stenophylla and Acerates auriculata—The Identity of. J. M. Holzinger. (Bot. Gaz. xvii. 160).

A supplementary note in which Mr. Holzinger corrects his mistake of taking up the name *Asclepias auriculata* for this species, there being a previously published *A. auriculata*, Kunth. But is it not more an *Acerates* than an *Asclepias*? N. L. B.

Ascyrum Crux-Andreæ. C. S. Sargent. (Gard. & For. v. 256; f. 49).

Beiträge zur Kenntniss der Gattung Tropeolum. F. Buchenau. (Engler's Bot. Jahresb. xv. 180-259).

Herr Buchenau recognizes forty-four species of this genus distributed from Central America to Chili, several of them here first described.

Communicability of Peach Yellows and Peach Rosette—Additional Evidence on the. Erwin F. Smith. (U. S. Depart. Agric. Bull. No. 1. 1891, illustrated).

Cross-Breeding and Hybridizing, with a Brief Bibliography of the Subject. L. H. Bailey. (The Rural Library, Vol. i. No. 6, pp. 44).

Cuphea viscosissima—Ueber die Epidermis der Samen von. C. Correns. (Ber. Deutsch. Bot. Gesell. x. 143-152, one plate).

Current Methods in Botanical Instruction. Conway Macmillan. (Pamph. pp. 8).

Flora Brasiliensis. Fasciculus CXI., Malvaceæ, Part II.

This completes Vol. xii., Part III. The genera *Malachra, Urera, Pavonia, Gœthea, Malvaviscus, Hibiscus, Kosteletzkya, Cienfugosia* and *Gossypium* are treated by Herr M. Gürke, and the geographical distribution and economic aspects of the Malvaceæ, by Dr. C. Schumann. The fascicle is illustrated by thirty-two plates.

Flora of Central Arizona. J. W. Toumey. (Bot. Gaz. xvii. 162-164.

Forms of Trees as Determined by Climatic Influences. Gustav Eisen. (Zoë, iii. 1-12).

Fungous Diseases of the Celery—Some. (New Jersey Ex. Sta. Bull. April, 1892).

Illustrations are given by Dr. Halsted of *Cercospora Apii, Phyllosticta Apii, Septoria Petroselini,* var. *Apii,* and *Puccinia bullata.*

Germination of the Teleutospores of Ravenelia cassiæcola. B. M. Duggar. (Bot. Gaz. xvii. 144-148; two plates).

Laboulbeniaceæ—Further Additions to the North American Species of. Roland Thaxter. (Proc. Amer. Acad. Arts & Sciences xxvii. 29-45; reprint).

Dr. Thaxter has detected thirty species of this order additional to those recorded in his former paper, making in all forty-nine North American species. *Ceratomyces*, *Corethromyces* and *Acanthomyces* are new genera, and many new species are described in *Heimatomyces* and *Laboulbenia*.

Lilium Grayi. J. G. Baker. (Curt. Bot. Mag. tab. 7,234).

A description of and note on the lily first gathered by Dr. Gray on Roan Mountain in 1840.

List of Species of the Genera Scirpus and Rynchospora occurring in North America. N. L. Britton. (Trans. N. Y. Acad. Sci. xi. 74-93: Contrib. Herb. Col. Coll. No. 26).

Thirty-six species of *Scirpus* are enumerated. *S. Peckii* from northern New York is described as distinct from its relatives, *S. polyphyllus* and *S. sylvaticus*; *S. microcarpus*, Presl., is maintained as a species; *S. Mexicanus*, Clarke, is *S. cyperoides*, Hemsley (1885), not Sprengel (1825); *S. Potosina*, Clarke, is a new species from Mexico (Pringle 3,175); *S. Hallii* and *S. Smithii* are maintained as species; *S. Americanus*, Pers. (1805) antedates *S. pungens*, Vahl. (1806), and a var. *longispicatus* of it from Colorado and New Mexico is described as new; *S. cylindricus* (Torr.) antedates *S. macranthus*, Bœckl. (1858), *S. leptolepis*, Chapm. (1860) and *S. Canbyi*, A. Gray (1864); *S. Californicus* (C. A. Meyer), antedates *S. Tatora*, Kunth.

Sixty species of *Rynchospora* are recognized. *R. Tracyi* is *Ceratoschœnus capitatus*, Chapm., not *R. capitata*, R. & S.; and several new varieties are described.

Loco Weeds. Alice Eastwood. (Zoë, iii. 53-58).

Manual of the Phanerogams and Pteridophytes of Western Texas Gamopetalæ. John M. Coulter. (Contrib. U. S. Nat. Herb. ii., Part 2).

This is the second part of Professor Coulter's useful flora of western Texas. *Perityle Vaseyi* is figured. The following corrections are made in his previously published account of Mr. Nealley's collections: *Aplopappus Texanus*, Coulter, proves to be *Haxloesthes Greggii*, A. Gray, and *Viguiera longipes*, Coulter, is *Zexmenia hispida*, A. Gray, which is also figured; *Ipomœa Nealleyi* Coulter is *Antirrhinum maurandioides*, A. Gray, and *I. Tex-*

ana Coulter is the South American *I. fistulosa*, Mart., escaped from cultivation. A considerable number of plants hitherto unknown north of the Mexican border are here recorded as Texan.

Mariposa County as a Botanical District. J. W. Congdon (Zoë, iii. 25-43).

A very interesting account of the general flora features of Mariposa County, California, with especial reference to geographic distribution.

Notes on Liliaceæ—II. Carl Purdy (Zoë, iii. 43, 44).

Marsilia vestita—On the Prothallium and Embryo of. Douglas Houghton Campbell. (Extract Proc. Cal. Acad. Sci. Ser. ii. Vol. iii).

Metaspermæ—The Embyro-sac of the. Conway Macmillan. (Bot. Gaz xvii. 161, 162).

New or Noteworthy Species. Edward L. Greene. (Pittonia, ii. 222).

Lotus Biolettii, *Trifolium fucatum*, Lindl., *T. flavulum*, *T. virescens*, *T. Gambelii*, Nutt., *Alyssum Americanum*, *Streptanthus Biolettii*, *S. pulchellus*, *Ranunculus Biolettii*, *Bolelia humilis*, *Erigeron leptophyllus*, *E. hyperboreus*, *E. Turneri*, *Callichroa nutans* (*Callichroa* antedates *Layia*); *Psacalium strictum* = *Prenanthes stricta*, Greene (1889) = *Luina Piperi*, Robinson (1891); *Silene purpurata*, *Cerastium grande*, *Tissa rubra*, var. *perennans*; *Brevoortia venusta*, *Fritillaria recurva*, var. *coccinea*; *Plagiobothrys Californicus*, *Allocarya stricta*, *Cryptanthe Kelseyana*, *Cryptanthe Bartolomæi* and *Collinsia arvensis* are described as new.

Notes on Carex.—XVI. L. H. Bailey. (Bot. Gaz. xvii. 148-153).

Notes on new localities for a number of rarer species and the following described as new: *Carex herbariorum*, *C. Pringlei*, *C. xerantica*, *C. Montanensis*, *C. bella* and *C. varia*, var. *australis*.

Notes on the Flora of Staten Island. Arthur Hollick. (Proc. Nat. Sci. Assn. Staten Island May 14th, 1892).

Record of additions to the lists of plants and of new localities for some rare species.

Novitiæ Peruvianæ. A. Zahlbruckener. (Ann. K. K. Naturhist. Hofmuseums Wien, vii. Heft 1 and 2; reprint, pp. 10).

New species from Peru are described in the genera *Viburnum*, *Psychotria*, *Rudgea*, *Myrsine*, *Conomorpha*, *Styrax*, *Nathusia*, *Echites*, *Solanum*, *Athenæa*, *Columnea*, *Amphilophium* and *Mesophæum*.

Officinelle Iridaceen Brasiliens. Theodor Peckolt. (Phar. Rundschau x. 132).

The medicinal properties of *Cipura paludosa*, *Alophia Sellowiana*, *Cypella coerulea*, *C. Northiana*, *Polia Sonariensis*, *Lansbergia cathartica*, *L. purgans*, *L. Caracasana* and *Sisyrinchium galaxoides* are noted.

Oncidium Gravesianum. R. A. Rolfe. (Gardn. Chronicle xi. 650).

A description with illustration of this new orchid from Brazil.

Opuntia Rafinesquii. (Meehan's Month. ii. 81, 82, colored plate).

Palæontology of the Cretaceous Formation on Staten Island. Arthur Hollick. (Trans. N. Y. Acad. Sci. xi. 96-104, 3 plates Contrib. Geol. Depart. Col. Coll. No. 2).

A preliminary note on the Cretaceous plants and mollusks hitherto found on Staten Island, with a description of the strata and mode of occurrence. The following plants are figured: *Protæoides daphnogenoides*, *Laurus plutonia*, *Sapindus Morisoni*, *Thinfeldia Lesquereuxiana*, *Eucalyptus Geinitzii*. *Liriodendron simplex*, *L. primævum*, *Rhamnus Pfaffiana*, *Ficus atavina*, *Dalbergia hyperborea*, *Diospyros primæva*, *Platanus Newberryana*.

Parastic Fungi. Adolph Lehman. (Ottawa Nat. vi. 38).

Pennsylvania Hardwood Forests. J. T. Rothrock. (Hardwood i. No. 8).

Pilocarpus pennatifolius. J. S. Hooker. (Curt. Bot. Mag. tab. 7235).

Plantæ Glazioviane novæ vel minus cognitæ. P. Taubert. (Engler's Bot. Jahrb. xv. Beiblatt No. 34).

New species from Brazil are described in the genera *Dactylæna*, *Paypayrola*, *Galipea*, *Cusparia*, *Metrodorea*, *Hortia*, *Dulacia*, *Licania*, *Hirtella*, *Combretum*, *Fuchsia*, *Abatia*, *Auxemma* and

Diosevrea. Herr. P. Hennings describes new species of fungi in the genera *Uromyces, Puccinia, Hymenochæte, Cladoderis, Polyporus, Phyllachora* and *Helotium.*

Practical Studies in Biology. I. The Potato. H. L. Osborn. (Amer. Month. Micros. Journ. xiii. 85-88; 105-110; illustrated).

Revision of the American Species of Rumex Occurring North of Mexico. Wm. Trelease. (3rd Ann. Rep. Missouri Bot. Gard. 74-98; plates 13-33; reprint).

Prof. Trelease recognizes twenty species of the genus within the area. *R. paucifolius,* Nutt. becomes *R. Geyeri* (Meisn.) the older name; *R. Arizonicus,* Britton, is referred to *R. hymenosepalus,* Torr. in which reduction we have no doubt he is in error, and all the North American plant which has gone as *R. maritimus,* is referred to *R. persicariodes,* L. The paper is illustrated by twenty plates, and will greatly facilitate the determination of these plants. N. L. B.

Restrepia striata. J. T. Hooker. (Curt. Bot. Mag. xlviii. tab. 7233).

Sereno Watson. John M. Coulter. (Bot. Gaz. xvii. 137-141, with portrait and interior view of the herbarium of Harvard University).

Spiræaceæ—On Certain. Edward L. Greene. (Pittonia, ii. 219-222).

Lutkea Hendersonii, from the Olympic Mts., Washington, is characterized as new. Professor Greene maintains *Spiræa corymbosa,* Raf., *S. lucida,* Dougl. and *S. pyramidata,* n. sp., all as distinct from the Siberian *S. betulæfolia,* Pall., to which he refers as American only a specimen from Alaska.

Systematische Stellung der Gattung Thorea, Bory. Fr. Schmitz. (Ber. Deutsch. Bot. Gesell. x. 115-143).

Tertiary Fossil Plants from Potosi, Bolivia. N. L. Britton. (Trans. Amer. Inst. Mining Engineer, Plattsburgh, Meeting, June, 1892; Contrib. Herb. Col. Coll. No. 27, Reprint, pp. 10; 79 figures).

This collection of fossil plants was made by Drs. A. F. Wendt and F. A. Canfield, engineers of the famous silver mines of Potosi. The following species are described as new: *Porliera tertiaria, Amicia antiqua, Cassia Wendtii, Escallonia Wendtii, Terminalia Wendtii, Cuphea antiqua, Passiflora* (?) *Canfieldi, Myrica Potosina, M. Engelhardtii* and *M. Wendtii.*

Tovariaceen—Zur Kenntniss der. G. de Lagerheim. (Ber. Deutsch. Bot. Gesell. x. 163-170).

A discussion of the systematic position of the genus *Tovaria,* R. and P.

Your Weeds and Your Neighbor's. C. F. Millspaugh. (Bull. W. Va. Agric. Exper. Sta.)

Dr. Millspaugh, as botanist of the West Virginia Experiment Station, is making a thorough study of the weeds of his State, the results of which are appearing in a series of bulletins under the above title. Part II deals with the distribution of weeds, their bad points, uses for fodder, and chemical weed exterminators.

Proceedings of the Club.

TUESDAY EVENING, MAY 10th, 1892.

The President in the chair and forty-seven persons present.

Mrs. Britton gave the announced paper of the evening on "Mosses, their Structure and Classification," illustrated by living and herbarium specimens and lantern slides.

WEDNESDAY EVENING, MAY 25, 1892.

Vice-President Mr. Thos. Hogg in the chair and twenty persons present.

The Secretary announced the death since the last meeting of Miss Phoebe McCabe, long an active member of the Club. Miss Steele and Mrs. Britton were appointed a committee to draw suitable resolutions expressive of the sentiments of the Club.

The Editor announced the death of Dr. Edouard von Regel, Director of the Botanical Garden at St. Petersburg, an honorary member. Dr. Britton, Dr. Porter and Dr. Morong were appointed a committee to draw resolutions expressing the sense of loss which the Club feels in the decease of this distinguished botanist.

The committee has prepared the following memorial:

In memory of Dr. Edouard von Regel, in whose recent death the club loses one of its most distinguished Honorary Members, we adopt the following minute:

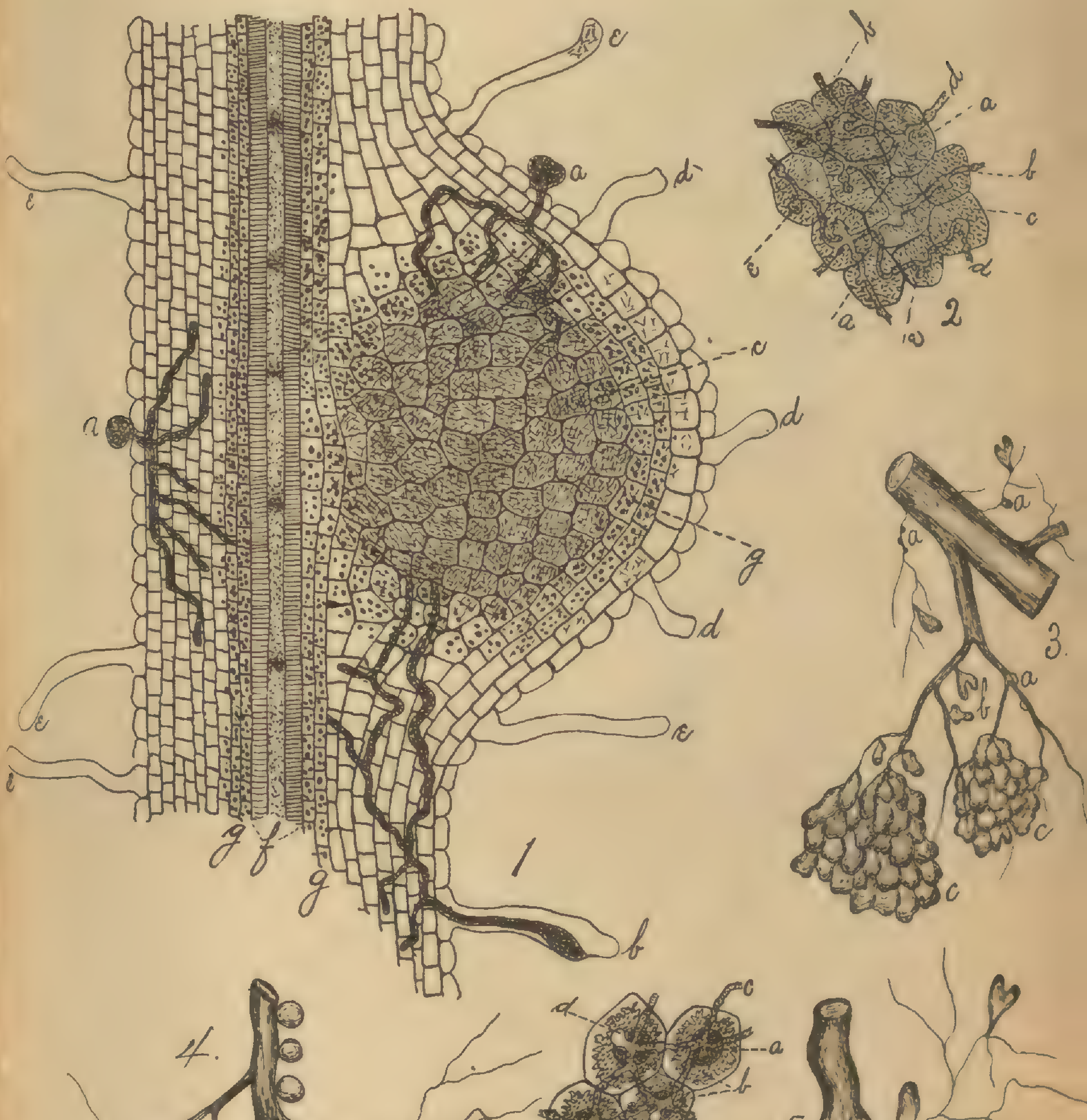
Dr. Regel is well-known as the author of numerous botanical works of great value, the first of which was published in 1843. Since that date he has contributed about a dozen works to the science, one of the most important being his monograph on Betulaceæ, published in Vol. 16 of the Prodromus of DeCandolle. For many years he has been the Director of the Botanical Garden at St. Petersburg, in which position he has contributed largely to the collection, determination and distribution of the plants of the Russian Empire. He is best known, perhaps, in connection with the northern Asiatic flora, in the arrangement and enumeration of which the latter years of his honored and useful life have been spent.

His death, occurring so soon after that of his great colleague, Maximowicz, is a heavy affliction to our associates at St. Petersburg, leaving a void not easily filled. We desire to express our profound sympathy with them under their bereavement, as well as to testify our high appreciation of the services which Dr. Regel has rendered to the world at large.

N. L. BRITTON,
THOMAS MORONG,
THOS. C. PORTER.

Dr. Emily L. Gregory gave the announced paper of the evening on "Some Facts in Reference to Old and New Views on Plant Physiology."

The Club then adjourned until the second Tuesday evening in October.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SOME AMERICAN RHIZOBIA. A. Schneider.

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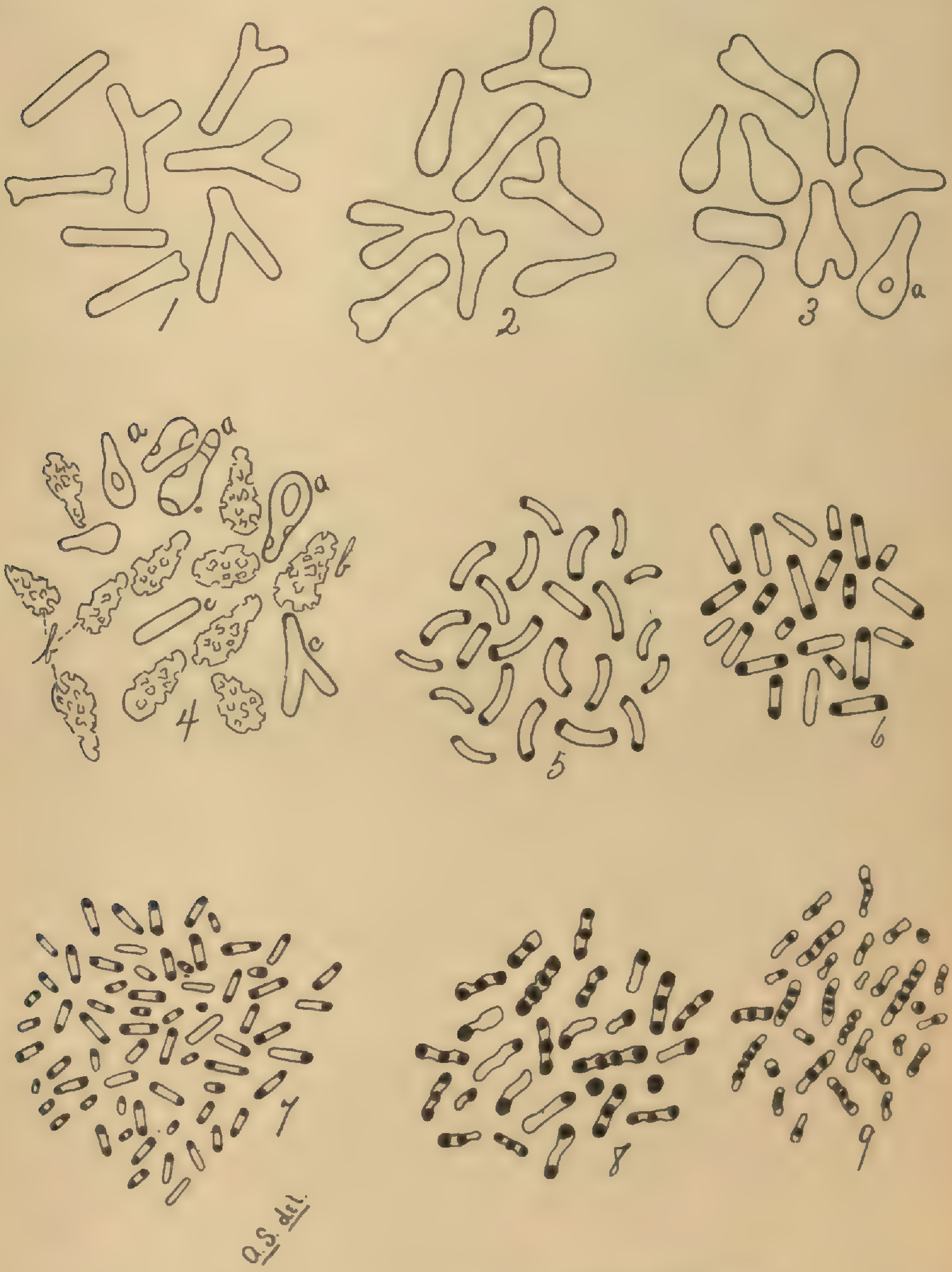
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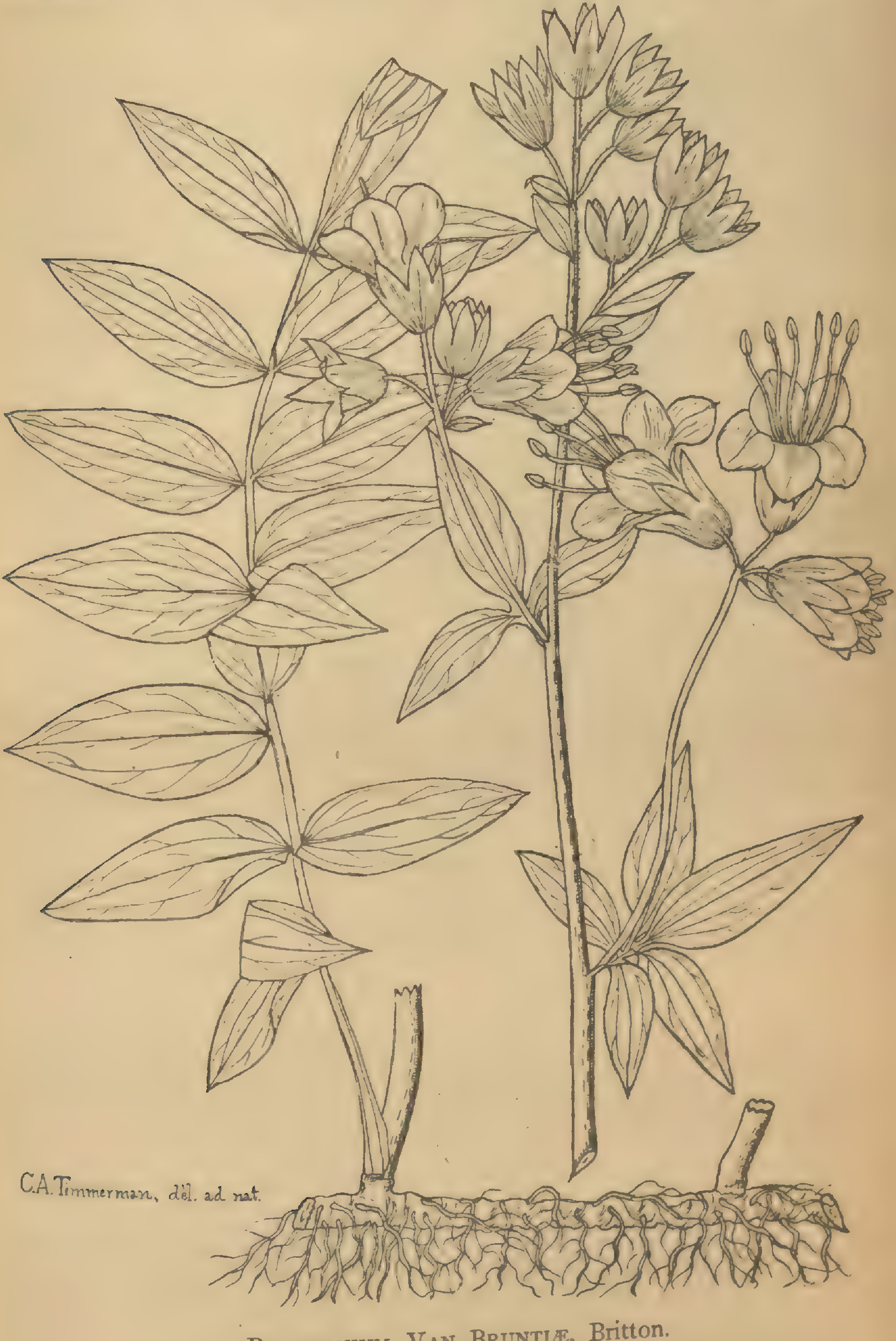

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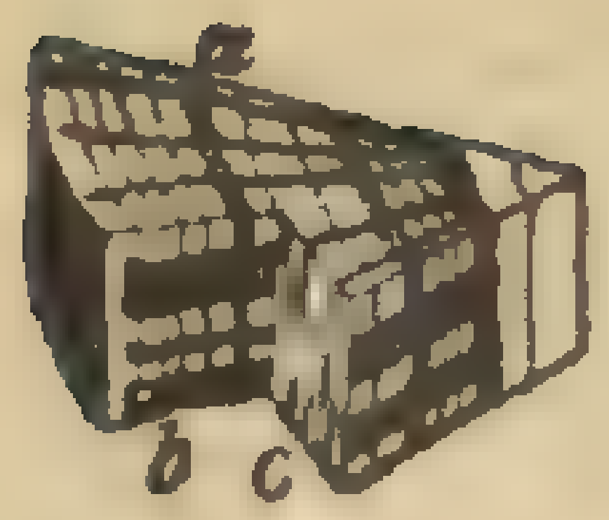

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Copies of the BULLETIN for June, July, August and September, 1881, (Vol. VIII, Nos. 6, 7, 8 and 9) are greatly desired by the Editors. If any one can furnish them they will be bought at 25 cents each.

VOL. XIX. AUGUST, 1892. No. 8.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

A MONTHLY JOURNAL OF BOTANY.

EDITED BY

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.

Plants collected in Alaska and Nanaimo, B. C., July and August, 1891: *Grace E. Cooley* and *Clara E. Cummings*.......... 239

An Enumeration of some rare North American Lichens: *J. W. Eckfeldt*...... 249

Piperaceæ Bolivianæ: *Casimir de Candolle*.................................. 254

BOTANICAL NOTES.—*Acer saccharinum*, L., in Eastern New Jersey: *Geo. V. Nash*; Interior Shoots in Potato Tubers: *W. Whitman Bailey*; The Rochester Meeting of the A. A. A. S..................... 255

PAGE.

RECENT LITERATURE RELATING TO AMERICAN BOTANY.—The Genus *Eustichia*; Fourth Supplement to the Flora of Mt. Desert Island; Third List of Additions to the Flora of Washington, D. C.; Report of the Chief of the Division of Forestry; Grasses of Tennessee, Part I; Contributions to the Life-Histories of Plants, No. VII; Some Oregon Weeds, and how to destroy them; The Fruiting of *Parmelia molliuscula*; Plants of the Pribilof Islands, Behring Sea, and briefer notices 259

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Members of the Club will please remit their annual dues for 1892, now payable, to Mr. Henry Ogden, Treasurer, 11 Pine St., New York City.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XIX.] New York, August 10, 1892. [No. 8.

Plants Collected in Alaska and Nanaimo, B. C., July and August, 1891.*

BY GRACE E. COOLEY, WELLESLEY COLLEGE.

I desire to thank Drs. Vasey and Trelease, Prof. Underwood, Mr. Bebb, and my friend and colleague, Miss Cummings, for kindness in determining the plants of those groups of which they have made special study; also Dr. Robinson, for his courtesy in placing the valuable material of the Gray Herbarium at my disposal.

RANUNCULACEÆ.

Aconitum delphinifolium, DC. Juneau; Sheep Creek, near Juneau.
Actæa alba, Bigel. Chilcat.
Actæa spicata, L. var *rubra*, Ait. Juneau.
Anemone narcissiflora, L. Above Silver Bow Basin, near Juneau.
Anemone parviflora, Michx. Above Silver Bow Basin, near Juneau.
Anemone Richardsoni, Hook. Above Silver Bow Basin.
Aquilegia formosa, Fisch. Juneau; Sheep Creek.
Coptis asplenifolia, Salisb. Salmon Creek, near Juneau; Sheep Creek.
Ranunculus Cooleyæ, Vasey and Rose, n. sp. Near the summit of a ridge covered with snow, near Juneau, Aug. 6. Description to be published later.
Ranunculus Cymbalaria, Pursh. Chilcat.
Ranunculus Eschscholtzii, Schlecht. Near Juneau.
Ranunculus occidentalis, Nutt. Near Juneau.
Ranunculus occidentalis, Nutt. var. *Lyalli*, Gray. Wrangel.
Ranunculus pygmæus, Wahl. Mountain above Silver Bow Basin, near Juneau.

BERBERIDACEÆ.

Achlys triphylla, DC. Nanaimo, B. C.

NYMPHÆACEÆ.

Nuphar luteum, Smith. Douglas Island.

---

* Supplementary to paper published in the June number.

CRUCIFERÆ.

Arabis lyrata, L. Juneau.
Arabis petræa, Law. var. *ambigua*, DC. Silver Bow Basin, near Juneau.
Cardamine hirsuta, L. Juneau.
Cochlearia officinalis, L. Loring.

VIOLACEÆ.

Viola Langsdorffii, Fisch. Juneau.
Viola palustris, L. Silver Bow Basin, near Juneau.

CARYOPHYLLACEÆ.

Arenaria arctica, Stev. New Metlakatla.
Arenaria oblongifolia, T. & G. Salmon Creek; Chilcat.
Arenaria pungens, Nutt. Juneau.
Arenaria tenella, Nutt. Nanaimo, B. C.
Cerastium alpinum, L. Sheep Creek, near Juneau.
Cerastium alpinum, L. Form clothed with long, silky pubescence. Mountain near Juneau.
Cerastium vulgatum, L. Mountain near Juneau.
Lepigonum medium, Fries. Loring.
Sagina Linnæi, Presl. Auriferous sand, Silver Bow Basin, Juneau.
Silene acaulis, Linn. Mountains about Juneau.
Stellaria borealis, Bigelow, var. *corallina*, Fenzl. Wrangel.
Stellaria crispa, Cham. & Schlecht. Juneau.
Stellaria humifusa, Rottb. Chilcat.
Stellaria longipes, Goldie. Above Silver Bow Basin, near Juneau.
Stellaria longifolia, Muhl. New Metlakatla.

PORTULACEÆ.

Claytonia parvifolia, Moçino. Juneau.
Claytonia Sibirica, L. Nanaimo, B. C., Juneau.

HYPERICACEÆ.

Hypericum anagalloides, Cham. & Schlecht. Nanaimo, B. C.

GERANIACEÆ.

Geranium erianthum, DC. Juneau; Sheep Creek, near Juneau.
Geranium rotundifolium, L. Nanaimo, B. C.
Impatiens fulva, Nutt. Juneau.

SAPINDACEÆ.

Acer macrophyllum, Pursh. Nanaimo, B. C.

LEGUMINOSÆ.

Astragalus alpinus, L. Mountain above Silver Bow Basin, near Juneau.
Lathyrus maritimus, Bigel. Chilcat.
Oxytropis campestris, DC. Mountain above Silver Bow Basin, near Juneau.
Oxytropis Lamberti, Pursh. Pyramid Harbor.
Trifolium involucratum, Willd. Nanaimo, B. C.

ROSACEÆ.

Dryos octopetala, L. Terminal Moraine of Davidson Glacier.
Eriogynia pectinata, Hook. Mountain above Silver Bow Basin, near Juneau.
Fragaria vesca, Linn. Nanaimo, B. C.
Geum calthifolium, Smith. Mountain near Juneau; Sheep Creek, near Juneau.
Geum macrophyllnm, Willd. Wrangel.
Potentilla palustris, Scop. Sphagnum swamp, near Juneau.
Poterium Sitchense, Watson. Juneau.
Rosa gymnocarpa, Nutt. Nanaimo, B. C.
Rubus Nutkanus, Moç. Loring.
Rubus pedatus, Smith. Juneau.
Rubus spectabilis, Pursh. Loring.
Rubus stellatus, Smith. Wrangel.
Rubus trivialis, Michx. Nanaimo, B. C.
Rubus ursinus, Cham. & Schlecht. Nanaimo, B. C.
Sibbaldia procumbens, L. Silver Bow Basin, near Juneau.
Spiræa Aruncus, Linn. Mountains near Juneau.
Spiræa betulæfolia, Pall. Juneau; Sheep Creek.
Spiræa discolor, Pursh. Nanaimo, B. C.

SAXIFRAGACEÆ.

Boykinia major, Gray. Juneau.
Leptarrhena pyrolifolia, R. Br. Mountain near Juneau.
Mitella pentandra, Hook. Mountain above Silver Bow Basin, near Juneau.
Parnassia fimbriata, Kœnig. Mountain above Silver Bow Basin, near Juneau.
Ribes bracteosum, Dougl. Near Juneau.
Ribes Hudsonianum, Rich. Nanaimo, B. C.
Ribes lacustre, Poir. Nanaimo, B. C; Moraine of Davidson Glacier.
Saxifraga bronchialis, L. Sheep Creek, near Juneau.
Saxifraga leucanthemifolia, Michx. Juneau.
Saxifraga Lyallii, Engl. Mountain-side, Juneau.
Saxifraga oppositifolia, L. Juneau.
Saxifraga punctata, L. Above Silver Bow Basin, near Juneau.
Saxifraga tricuspidata, Retz. Sheep Creek, near Juneau.
Tellima grandiflora, R. Br. Juneau.
Tiarella trifoliata, L. Nanaimo, B. C.; Juneau.

CRASSULACEÆ.

Sedum Rhodiola, DC. Juneau.

DROSERACEÆ.

Drosera rotundifolia, L. Douglas Island.

ONAGRACEÆ.

Boisduvalia Torreyi, Wats. Nanaimo, B. C.
Circæa alpina, L. Nanaimo, B. C.
Epilobium anagallidifolium, Lam. Near Juneau.
Epilobium adenocaulon, Hausskn. (?) Near Juneau,
Epilobium boreale, Hausskn. (?) Near Juneau.

Epilobium Franciscanum, Barbey. Apparently from unusually far north. Near Juneau.

Epilobium Hornemanni, Reichenb. Near Juneau.

Epilobium latifolium, L. With white form as well. Mountain near Juneau.

Epilobium luteum, Pursh. Juneau,

Epilobium leptocarpum, Hausskn. var. (?) The Alaskan form noted in my revision. Near Juneau. [Wm. Trelease].

UMBELLIFERÆ.

Heracleum lanatum, Michx. Juneau.

Ligusticum Scoticum, L. Shore Gastineaux Channel.

Osmorrhiza nuda, Torr. Juneau.

Selinum Benthami, Wats. Chilcat.

Selinum Hookeri, Wats. Chilcat.

ARALIACEÆ.

Fatsia horrida, Benth. & Hook. Everywhere in the forests.

CORNACEÆ.

Cornus Canadensis, L. Wrangel.

CAPRIFOLIACEÆ.

Sambucus racemosa, L. Wrangel.

Symphoricarpos mollis, Nutt. Nanaimo, B. C.

Symphoricarpos occidentalis, Hook. Nanaimo, B. C.

Viburnum pauciflorum, Pylaie. Sheep Creek, near Juneaa,

RUBIACEÆ.

Galium Aparine, L. Wrangel ; Juneau.

VALERIANACEÆ.

Valeriana Sitchensis, Bong. Silver Bow Basin, near Juneau.

Valerianella anomala, Gray. Nanaimo, B. C.

COMPOSITÆ,

Adenocaulon bicolor, Hook. Nanaimo, B. C.

Anaphalis margaritacea, Benth. & Hook. Chilcat.

Antennaria alpina, Gærtn. Mountain near Juneau.

Arnica alpina, Olin. (?) Mountain near Juneau.

Arnica latifolia, Bong. Above Silver Bow Basin, near Juneau. Near the snow, above tree-line (not "in woods," as Gray has it).

Arnica Unalaschensis, Less. Mountain near Juneau.

Artemisia Norvegica, Fries. var. *Pacifica*, Gray. Above Silver Bow Basin, near Juneau. Two distinct forms: one glabrous, heads small ; one white-hairy, heads larger.

Aster foliaceus, Lindl. Juneau.

Aster modestus, Lindl Sheep Creek, near Juneau.

Chrysanthemum arcticum, L. Chilcat.

Cotula coronopifolia, L. Nanaimo, B. C.

Erigeron salsuginosus, Gray var. *angustifolius*, Gray. Douglas Island.

Erigeron uniflorus, L. Mountain above Silver Bow Basin, near Juneau.

Eriophyllum cæspitosum, Dougl. Nanaimo, B. C.
Gnaphalium purpureum, L. Nanaimo, B. C.
Hieracium albiflorum, Hook. Nanaimo, B. C.
Hieracum triste, Cham. Mountain slope near Alaska.
Madia Nuttallii, Gray. Nanaimo, B. C.
Petasites palmata, Gray. Above Silver Bow Basin, Juneau. The plants closely resemble *P. nivalis*, Greene (Pit. ii. p. 18) founded on speeimens collected, in fruit only, by Smith on Mt. Ranier.
Prenanthes alata, Gray. Loring.
Senecio triangularis, Hook. Silver Bow Basin, near Juneau.
Silybum Marianum, Gærtn. Near steamer landing, Nanaimo, B. C.
Solidago lepida, DC. Juneau.
Sonchus asper, Vill. Nanaimo, B. C.
Taraxacum officinale, Web. var. *lividum*, Koch. Mountain above Silver Bow Basin, near Juneau.
Troximon heterophyllum, Greene. Nanaimo, B. C.

CAMPANULACEÆ.

Campanula lasiocarpa, Cham. Juneau.
Campanula Scouleri, Hook. Nanaimo, B. C.; Wrangel.
Campanula rotundifolia, L., var. *arctica*, Lange. Juneau.

ERICACEÆ.

Arbutus Menziesii, Pursh. Nanaimo, B. C.
Bryanthus glanduliflorus, Gray. Mountain near Juneau.
Cassiope Mertensiana, Don. Mountain near Juneau.
Cassiope Stelleriana, DC. Mountain near Juneau.
Gaultheria Shallon, Pursh. Nanaimo, B. C.; Loring.
Kalmia glauca, Ait. Douglas Island.
Loiseleuria procumbens, Desv. Mountaln near Juneau.
Menziesia ferruginea, Smith. Loring.
Moneses grandiflora, Salisb. Salmon Creek, near Juneau.
Monotropa Hypopitys, L. Chilcat.
Pterospora Andromedea, Nutt. Nanaimo, B. C.
Pyrola minor, L. Above Silver Bow Basin, near Juneau.
Pyrola secunda. L. Chilcat.
Vaccinium ovalifolium, Smith. Wrangel; Loring.
Vaccinium parvifolium, Smith. Nanaimo, B. C; Loring.
Vaccinium uliginosum, L. Juneau.
Vaccinium Vitis-Idæa, L. New Metlakatla.

PRIMULACEÆ.

Dodecatheon Meadia, L., var. *macrocarpum*, Gray. Douglas Island.
Glaux maritima, L. Sea beach, near Juneau.
Trientalis Europæa, L. Sheep Creek and Salmon Creek, near Juneau.

GENTIANACEÆ.

Gentiana Amarella, L., var. *acuta*, Hook. f. Port Townsend, Washington.
Gentiana arctophila, Griseb. Mountain above Silver Bow Basin, near Juneau.

Gentiana Douglasiana, Bong. Douglas Island ; New Metlakatla.
Menyanthes Crista-galli, Menzies. Douglas Island ; Sphagnum swamp, near Juneau.

POLEMONIACEÆ.

Gilia capitata, Dougl. New Metlakatla.
Gilia tenella, Benth. Nanaimo, B. C.

HYDROPHYLLACEÆ.

Romanzoffia Sitchensis, Bong. Juneau.

BORRAGINACEÆ.

Eritrichium Scouleri, A. DC. Nanaimo, B. C.
Mertensia maritima, Don. Beach, near Gold Creek.

SCROPHULARIACEÆ.

Castilleia miniata, Dougl. Sheep Creek, near Juneau.
Mimulus luteus, L. Juneau.
Mimulus moschatus, Dougl. Nanaimo, B. C.
Pedicularis Langsdorffii, Fisch., var. *lanata*, Gray. Mountain near Juneau.
Pedicularis palustris, L., var. *Wlassoviana*, Bong. Douglas Island ; New Metlakatla.
Rhinanthus Crista-galli, L. Chilcat.
Veronica alpina, L. Mountain above Silver Bow Basin.
Veronica Americana, Schwein. Salmon Creek, near Juneau.

LABIATÆ.

Brunella vulgaris, L. Juneau.
Micromeria Douglasii, Benth. Nanaimo, B. C.
Stachys ciliata, Dougl., var. *pubens*, Gray, Nanaimo, B. C.

CHENOPODIACEÆ.

Atriplex patulum, L., var. *littorale*, Gray. Salmon Creek, near Juneau.

POLYGONACEÆ.

Kœnigia Islandica, L. Auriferous sand, Silver Bow Basin, near Juneau.
Oxyria digyna, Hill. Juneau, July 24.
Polygonum viviparum, L. Mountain near Juneau.
Rumex salicifolius, Weinm. Wrangel.

CUPULIFERÆ.

Alnus viridis, DC. Gold Creek, near Juneau.

SALICACEÆ.

Populus trichocarpa, T. & G. (?) Sheep Creek, near Juneau ; terminal moraine Davidson Glacier.
Salix arctica, Pallas. Mountain near Juneau.
Salix Barclayi, Anders. Silver Bow Basin, near Juneau.
Salix Brownii, Bebb. var. Leaves oblanceolate, acuminate, almost folded together and recurved, attenuate at base, 2-2½ inches long, 1 inch or less wide, very thin veins scarcely elevated ; petioles slender, ½ inch or less long ; stipules none ; aments elongated, flexuose, 2-3 inches long, borne on slender conspicuously leafy peduncles. This would seem to merit varietal distinction, but, owing to

the confusion which exists concerning the forms intermediate between *S. arctica* and *S. Brownii*, it would be inexpedient to impose a new name.

The plant appears to be an extreme modification of the mountain form of *S. Brownii*, and was found associated with an Alpine flora near the line of perpetual snow. On some accounts it might reasonably be referred (from the description) to *S. arctica, Brownii, obovata*, Anders. (DC. Prod. 16, 2, 286) but that is based upon coast forms from Unalaschka which almost certainly belong to *S. arctica*, Pall. Unfortunately, the Kew Herbarium does not help us out. Mr. Baker writes that "Dr. Andersson has not, with casual exception, authenticated his varieties of *S. arctica*, but only the species as a whole." [M. S. Bebb.] Mountain above Silver Bow Basin near Juneau, August 6.

Salix ovalifolia, Traut. Mountain above Silver Bow Basin.
Salix reticulata, L. Mountain above Silver Bow Basin.
Salix Sitchensis, Lawson, var. *denudata*, Anders. Silver Bow Basin.
Salix speciosa, Hook. and Arn. Moraine of Davidson Glacier.

EMPETRACEÆ.

Empetrum nigrum, L. Douglas Island

CONIFERÆ.

Picea Sitchensis, Carr. Juneau, widely distributed.
Thuja gigantea. Nutt. Nanaimo, B. C.

ORCHIDACEÆ.

Goodyera Menziesii, Lindl. Loring; Chilcat.
Habenaria bracteata, R. Br. Mt. above Silver Bow Basin, near Juneau.
Habenaria Chorisiana, Cham. Douglas Island.
Habenaria gracilis, Wats. New Metlakatla.
Habenaria hypoborea, R. Br. New Metlakatla.
Habenaria leucostachys, Wats. Douglas Island.
Spiranthes Romanzoffiana, Cham. New Metlakatla.

LILIACEÆ.

Allium , Nanaimo, B. C.
Brodiæa minor, Wats. Nanaimo, B. C.
Clintonia uniflora, Kunth. Loring.
Maianthemum bifolium, DC., var. *dilatatum*, Wood. Loring.
Streptopus amplexifolius, DC. Wrangel, Loring, Juneau, etc.
Streptopus brevipes, Baker. Juneau.
Tofieldia coccinea, Richards. Above Silver Bow Basin, near Juneau.
Tofieldia occidentalis, Wats. Douglas Island, New Metlakatla.
Veratrum viride, Ait. Mountains about Juneau.

JUNCACEÆ.

Juncus castaneus, Smith. Silver Bow Basin, near Juneau.
Juncus Drummondii, Mey. Mountain near Juneau.
Juncus Mertensianus, Mey. Mountain near Juneau.
Luzula parviflora, Desv. Silver Bow Basin, near Juneau.

ARACEÆ.

Lysichiton Kamtschatcense, Schott. Juneau.

NAIADACEÆ.

Triglochin maritima, L. Sea-marsh, Salmon Creek, near Juneau.

CYPERACEÆ.

Carex limosa, L., var. *stygia*, Bailey. Sphagnum Swamp, near Juneau.
Carex Mertensii, Presc. Mountain near Juneau.
Carex podocarpa, R. Br. Sphagnum swamp, Silver Bow Basin, near Juneau.
Carex ? Mountain near Juneau.
Eriophorum gracile, Koch. Sphagnum swamp, Silver Bow Basin, near Juneau.

GRAMINEÆ.

Deschampsia atropurpurea, Scheele. Mountain near Juneau.
Phleum alpinum, L. Juneau.
Poa alpina, L. Mountain near Juneau.
Poa stenantha, Trin., var. *vivipara*, Trin. Mountain near Juneau.

EQUISETACEÆ.

Equisetum arvense, L. Mountains above Silver Bow Basin, Juneau.
Equisetum hyemale, L. Mountain above Silver Bow Basin.
Equisetum Near Juneau.
Equisetum Near Juneau.

FILICES.

Aspidium aculeatum, Swartz. Juneau.
Aspidium Boottii, Tuckerm. Loring.
Aspidium Lonchitis, Swartz. Above Silver Bow Basin, near Juneau.
Aspidium spinulosum, Swartz., var. *dilatatum*, Hornem. Juneau.
Aspidium spinulosum, Swartz., var. *intermedium*, Eaton. Wrangel.
Cryptogramme achrosticoides, R. Br. Juneau, Nanaimo, B. C., Sheep Creek.
Cystopteris fragilis, Bernh. Juneau.
Lomaria Spicant, Desv. Nanaimo, B. C., Wrangel.
Phegopteris Dryopteris, Fée. Nanaimo, B. C., Juneau.
Phegopteris polypodioides, Fée. Juneau.
Polypodium vulgare, Linn. Killisnov.
Pteris aquilina, L., var. *lanuginosa*, Bong. Juneau.

LYCOPODIACEÆ.

Lycopodium complanatum, L. Mountain above the Basin, near Juneau.
Lycopodium annotinum, L. Mountain above the Basin, Juneau.
Lycopodium Selago, L. Above Silver Bow Basin, near Juneau.

HEPATICÆ.

(Determined by Dr. Lucien M. Underwood).

Bazzania deflexa, B. Gr. Loring..
Cephalozia multiflora, Lindb. Salmon Creek, near Juneau.
Chiloscyphus polyanthos, Corda., var. *rivularis*, Nees. Salmon Creek, near Juneau; new to Alaska.
Conocephalus conicus, Dumort. Salmon Creek, near Juneau.
Kantia trichomanis, Dumort. Sitka.
Lepidozia reptans, Dumort. Sitka.

Marchantia polymorpha, L. Nanaimo, B. C., Mountains near Juneau.

Metzgeria hamata, Lindb. Gold Creek, near Juneau. Not found since Sullivant distributed it from the Lower Alleghanies in 1845.

Metzgeria pubescens, Raddi. Gold Creek, near Juneau.

Pellia epiphylla. Nees. Sitka, Salmon Creek; new to Alaska.

Porella platyphylla, Sheep Creek, near Juneau.

Preissia hemisphærica, Cogn. Mountains near Juneau.

Scapania nemorosa, Nees. Gold Creek, near Juneau, Sitka.

LIST OF MOSSES AND LICHENS.

By CLARA E. CUMMINGS.

MOSSES.

Dicranoweisia crispula, Lindb. Above the Basin, Juneau.

Dicranella crispa, Schimp. Juneau.

Dicranella heteromalla, Schimp. Juneau, and at Gold Creek Cañon, near Juneau.

Dicranum fuscescens, Turn. Sitka.

Dicranum scoparium, Hedw. Loring, also at Salmon Creek, near Juneau.

Dicranum majus, Turn. Sitka.

Ceratodon purpureus, Brid. Juneau; also at Salmon Creek and Gold Creek Cañon, near Juneau, and at Nanaimo, B. C.

Blindia acuta, Br. and Schimp Juneau 3,000 ft.; also at Salmon Creek and Gold Creek Cañon, near Juneau.

Grimmia Californica, Sulliv. Above the Basin, Juneau.

Racomitrium aciculare, Brid. Juneau, and at Gold Creek Cañon, near Juneau.

Racomitrium canescens Brid. Near the snow line, above the Basin, Juneau; also Davidson Glacier, Terminal Moraine, Pyramid Harbor, on the Sound near the shore. Plants with few lateral branches.

Hedwigia ciliata, Ehrh., var. *leucophæa*, Schimp. Juneau.

Ulota crispa, Brid. Sheep Creek, near Juneau.

Ulota crispula, Brid. Sitka.

Tetraphis geniculata, Girgens. Salmon Creek, near Juneau, Sitka; very fine specimens.

Bartramia pomiformis, Hedw. Juneau, 3,000 ft.; also at Salmon Creek and Gold Creek Cañon, near Juneau.

Philonotis Macounii, Lesq. & James. Juneau 3,000 ft.; also a doubtful specimen from Gold Creek Cañon, near Juneau.

Philonotis fontana, Brid. Near the snow line, above the Basin, Juneau.

Philonotis fontana, Brid., var. *serrata*, Kind. On earth, Gold Creek Cañon, near Juneau. The variety not yet published, but kindly named by Mrs. Britton from the advance sheets of Macoun's Catalogue.

Webera nutans, Hedw. Salmon Creek, near Juneau, Loring; also at Nanaimo, B. C.

Webera cruda, Schimp. Gold Creek Cañon, near Juneau.

Webera commutata, Schimp. (?) Same locality.

Bryum pallens, Swartz. Douglas Island.

Bryum pseudotriquetrum, Schwægr. Nanaimo, B. C.

Bryum . Juneau.

Mnium orthorrhynchum, Br. & Sch. (?) Salmon Creek, near Juneau.

Mnium punctatum, Hedw. Loring, Sitka, Salmon Creek, near Juneau; near the snow line above the Basin, Juneau.

Atrichum undulatum, Beauv. Juneau.

Pogonatum capillare, Brid. Salmon Creek, near Juneau.

Pogonatum contortum, Lesq. Loring.

Pogonatum alpinum, Rœhl. Juneau, 3,000 ft.; Salmon Creek, near Juneau; also at Sheep Creek, near Juneau.

Pogonatum urnigerum, Beauv. Juneau, 3,000 ft.; also at Salmon Creek and Gold Creek Cañon, near Juneau.

Polytrichum commune, L. Loring, Sitka, Chilcat.

Antitrichia curtipendula, Brid. Sheep Creek, near Juneau.

Climacium Americanum, Brid. Sterile. Sheep Creek, near Juneau.

Climacium Ruthenicum, Lindb. Very fine fruiting specimens. Salmon Creek, near Juneau, and at Sitka.

Hypnum (*Camptothecium*) *lutescens*, Huds. Sheep Creek, near Juneau.

Hypnum (*Isothecium*) *myosuroides*, L. Loring.

Hypnum (*Plagiothecium*) *pulchellum*, Dicks. Above the Basin, near Juneau.

Hypnum (*Plagiothecium*) *denticulatum*, L. Sitka.

Hypnum (*Plagiothecium*) *undulatum*, L. Loring, Juneau, and also at Salmon Creek, near Juneau, Sitka.

Hypnum (*Harpidium*) *uncinatum*, Hedw. Juneau, 6,000 ? ft.; and at Salmon Creek and Gold Creek Cañon, near Juneau.

Hypnum circinale, Hook. At Salmon and Sheep Creeks, near Juneau.

Hypnum subimponens, Lesq. At Sheep Creep and at Gold Creek Cañon, near Juneau.

Hypnum (*Pleurozium*) *splendens*, Hedw. Loring, Sitka, Salmon Creek and Gold Creek Cañon, near Juneau.

Hypnum (*Hylocomium*) *loreum*, L. Sitka, Loring, Juneau, 3,000 ft.; Sheep Creek and Salmon Creek, near Juneau.

LICHENS.

Cetraria glauca (L.), Ach. Sheep Creek and Salmon Creek, near Juneau; Sitka.

Alectoria Fremontii, Tuck. Salmon Creek, near Juneau, Sitka.

Alectoria ochroleuca (Ehrh.), Nyl., var. *sarmentosa*, Nyl. Salmon Creek and Sheep Creek near Juneau; Sitka.

Parmelia saxatilis (L.), Fr. Sheep Creek, near Juneau.

Parmelia physodes (L.), Ach., var. *enteromorpha*, Tuck. Loring, Juneau, and at Sheep Creek, near Juneau; Sitka.

Parmelia physodes (L.), Ach., var. *vittata*, Ach. Loring.

Sticta pulmonaria (L.), Ach. Salmon Creek, near Juneau.

Sticta Oregana, Tuck. Loring; Sheep Creek, near Juneau.

Sticta limbata (Sm.), Ach. Sheep Creek and Salmon Creek, near Juneau.

Nephroma tomentosum (Hoffm.), Kœrb. Salmon Creek, near Juneau.

Peltigera aphthosa (L.), Hoffm. Loring; Sheep Creek, near Juneau.

Peltigera polydactyla (Neck.), Hoffm. Gold Creek Cañon, near Juneau.

Peltigera canina (L.), Hoffm. Nanaimo, B. C.; also specimens doubtfully referred to this from Salmon Creek, near Juneau.

Leptogium tremelloides (L. fil.), Fr. Salmon Creek, near Juneau.

Lecanora elatina, Ach., var. *ochrophaea*, Tuck. Sheep Creek, near Juneau.

Lecanora pallescens (L.), Schær. Sheep Creek, near Juneau.

Lecanora pallescens (L.), Schær., var. *rosella*, Tuck. Sheep Creek, Juneau.

Stereocaulon tomentosum (Fr.). Th. Fr. Sheep Creek, near Juneau; Davidson Glacier.

Pilophorus cereolus (Ach.), var. *acicularis*, Tuck. Juneau, 3,000 ft.; Salmon Creek and Gold Creek Cañon, near Juneau.

Cladonia mitrula, Tuck. Juneau.

Cladonia fimbriata (L.), Fr. Loring; also a doubtful form from Sheep Creek, Juneau.

Cladonia fimbriata (L.), Fr., var. *tubæformis*, Fr. Sheep Creek, Juneau.

Cladonia squamosa, Hoffm. Sheep Creek, Juneau; also at Nanaimo, B. C.

Cladonia rangiferina (L.), Hoffm. Salmon Creek and Sheep Creek, near Juneau.

Cladonia rangiferina (L.), Hoffm., var. *sylvatica*, L. Salmon and Sheep Creek, near Juneau.

Cladonia macilenta (Ehrh.), Hoffm. Loring.

Bæomyces æruginosus (Scop.), DC. Loring; Salmon Creek, near Juneau.

Heterothecium sanguinarium (L.), Flot. Juneau; also at Sheep Creek near Juneau.

Sphærophorus globiferus (L.), DC. Loring; also at Salmon Creek, near Juneau.

My thanks are due to Mrs. Britton, for assistance in naming some of the mosses, and to Prof. A. B. Seymour, for his kindness in comparing some of the lichens in the Tuckerman Herbarium.

CLARA E. CUMMINGS.

An Enumeration of Some Rare North American Lichens.

By Dr. J. W. Eckfeldt.

The following list of species is intended to embrace some plants that are but little known to the botanists of North America, and in order to illustrate them better than by a simple list of names, I herewith give the general description from plants in my herbarium, hoping thereby to render them better understood by those who are pursuing the study of lichenology. The lichens, to which I have here referred, are all of the Graphidacei, with two exceptions. From the special interest that I have taken in these plants, I consider them worthy to be brought into notice for the benefit of those who may be collecting in the neighborhood where they were found.

Placodium aphanotripta (Nyl.), Eck. Thallus effuse granulose, made up of very minute ascendant lobules, which are closely crowded into a uniform crust, supporting a delicate light blue hypothallus, grayish green, tending to a brighter yellow. Apothecia 0.5 mm., scattered, small and flattened, concave, mostly sunken or slightly raised above the surface of the thallus, the bright orange disk with a crenulate or wavy margin, which is thickened and paler in color. Spores broadly ellipsoid, polar bilocular, $\frac{18}{9}$-$\frac{19}{10}$ mic. Reaction with potash bright red.

Upon bark of various trees in the mountain regions, Monterey, Mexico; Mr. C. G. Pringle. A very fine and beautiful species belonging to the stock of *Callopisma*. (*Lecanora aphanotripta*, Nyl. Lich. Japonicæ, 104).

BUELLIA AMPHOREA (Tek.), Eck. Thallus mostly contiguous, disposed in broad, irregular patches, from smoothish to finely granulose, gradually becoming thin on the margin, supported by a delicate bluish hypothallus, from ashy green assuming a pale yellow color. Apothecia scattered, diffiform, elevated, from reddish brown to very black, concave, disk pale, surmounted by a thick rugose thalline margin. Spores oblong-ellipsoid, brown, bilocular $\frac{10}{5}$-$\frac{12}{6}$ mic.

On various barks, mountains near Monterey, Mexico. Mr. C. G. Pringle, No. 112. This species has most likely been quite unnoticed, and from the general characters referred to a closely allied species, *B. parasema*. (*Lecidea amphora*, Tek.).

OPEGRAPHA MESOPHLABIA, Nyl. Thallus membranous, slightly roughened, uneven, delicately wrinkled and tartrous, expanding uniformly into a regular crust, from pale brown becoming olivaceous and fading into an ashy shade. Apothecia brown, simple, becoming tortulose, and assuming no regular system, being stout and rather prominent, convex supported by a paler thalline border. Spores broadly ellipsoid or sub-fusiform, quadrilocular, brown, $\frac{16}{4}$-$\frac{20}{5}$ mic.

Usually upon rough barks in the neighborhood of San Luis Potosi, Mexico. Mr. C. G. Pringle, No. 230. This beautiful species, so far as I am aware, occurs only in the region specified.

OPEGRAPHA MICROBLEPHIA, Nyl. Thallus smooth but somewhat granulose, indistinctly obscured by the numerous apothecia, from pale ashy to dull white, dispersed irregularly over contracted areas. Apothecia wavy and irregular, frequently anastomosing and branched, diffiform and moderately elevated, concave with an incurved, thalline margin. Spores broadly dactyloid, quadrilocular, brown, $\frac{11}{4}$-$\frac{12}{5}$ mic.

On the bark of *Quercus*, in the mountains of Monterey, Mexico, Mr. C. G. Pringle. This rare species has probably escaped notice, yet the general aspect which it bears, and the slight resemblance to other species, make the type distinct.

OPEGRAPHA SCAPHELLA, Nyl., var. GEMELLA (Esch.), Thallus contiguous, very thin, membranous, smooth and shining as occurring in narrow patches, circumscribed by an irregular border which finally becomes indeterminate, from whitish passing into a brown, where it frequently becomes obsolete. Apothecia very small, black and scattered, mostly straight. Spores broadly ellipsoid, and more or less tapering at one end, bilocular, decolorate, $\frac{14}{3}$-$\frac{16}{5}$ mic.

This plant was first found by Mr. H. A. Green, from whom I received the specimens, on the bark of *Hamamelis Virginica*, at Crowders Mountain, N. C., (*Melaspilea gemella*, Esch.).

GRAPHIS TENELLA, Ach. Thallus membranous, thin and slightly roughened, spreading and circumscribed by a well-developed and prominent brown band of an extended hypothallus, from white or tawny ash-color verging into a pale olive. Apothecia simple, irregular and frequently broken, elevated and very prominent and convex, brown. Spores ellipsoid to sub-fusiform, pale brown, 5-6-locular, $\frac{18}{4}$-$\frac{20}{5}$ mic.

So closely related is this plant to *G. scripta* that I have seen it distributed under that name, but the tropical origin, as well as other peculiarities, are convincing that the plant is truly distinct. It occurs on barks at San Luis Potosi, Mexico, Mr. C. G. Pringle, No. 168.

GRAPHIS EGENA, (Nyl.). Thallus much as in *G. nitida* but often of an olivaceous yellow, thin membranous, opaque, quite smooth, frequently broken by transverse fissures. Apothecia poorly developed, scattered, simple, and represented by small, white, mealy lines, which soon become expanded, exhibiting a darker surface within. Spores broadly ellipsoid, bilocular, each containing one cell, $\frac{14}{3}$-$\frac{15}{5}$ mic. Reaction red.

This plant belonging to the section *Fissurina*, may readily be misunderstood, yet the characters are such as to render it less misleading if found in well developed conditions. On barks, San Luis Potosi, Mexico. Mr. C. G. Pringle, No. 192. (*Fissurina egena*, Nyl.).

GRAPHIS ADSCRIBENS, Nyl. Thallus membranous, thinish, smooth and shining with a somewhat uneven surface, from pale ashy to a greenish gray. Apothecia simple, small, narrow and flexuous, more or less sunken or at length even with the surface or hidden, sessile. Thecæ cylindrical, spores ellipsoid, decolorate $\frac{18}{6}-\frac{19}{7}$ mic., spore cells six, a larger one at one end. Reaction with potash, yellow.

This plant has a general southern range, extending from the low sections of Florida to Mexico, where it is common in the neighborhood of San Luis Potosi. Mr. Calkins and C G. Pringle.

GRAPHIS BALBISII, Nyl Thallus uneven, granulose to minutely papillose, broken by fissures into a somewhat irregular crust, from ash-color to a delicate yellow. Apothecia elevated, contorted, gyrose and diffiform supporting a thickened and stout inflexed border which is distinctly brighter in color than the thallus. The spores are long-fusiform to long-ellipsoid, plurilocular and contain numerous spore cells, averaging from 14 to 20, mostly decolorate, $\frac{47}{8}-\frac{64}{10}$ mic.

On barks in the mountains near Monterey, Mexico, Mr. C. G. Pringle, No. 119.

GRAPHIS LACTEA, (Nyl.) Thallus contiguous, diffuse, from smooth becoming furrowed and irregularly broken in minute fissures, pale ashy inclining to a delicate saffron color, limited and bordered by a distinct darkening hypothalline line. Apothecia irregular, diffiform, concave with raised borders, which are more or less white and mealy. Spores large, broadly ellipsoid, slightly curved, plurilocular, having about eight septæ, the apical cells larger, $\frac{39}{12}-\frac{46}{13}$ mic.

On the bark of *Ilex*, San Luis Potosi, Mexico, Mr. C. G. Pringle, No. 210 (*Fissurina lactea*, Nyl.) A well-defined type of the section *Fissurina* which may be better developed in more equatorial regions.

GRAPHIS ANGUILLIFORMIS, Nyl. Thallus thin, generally diffused over large areas, smooth and shining and frequently broken by long transverse fissures, from white to ashy and darker. Apothecia simple, very numerous, from short gradually lengthening and bent in different directions, very conspicuous and elevated, black with a paler thalline border. Spores numerous spindle-shaped, plurilocular, decolorate, $\frac{54}{9}-\frac{82}{12}$ mic.; spore cells from 14 to 20. Reaction with potash, yellow.

On barks San Luis Potosi, Mexico, Mr. C. G. Pringle, No. 166. The general appearance is not unlike some forms of *G. scripta*, to which it has been referred.

GRAPHIS PERALBIDA, Nyl. Thallus leprous, thinly attached to the substratum, smoothish to somewhat granulate, whitish to a pale ashy gray, more or less orbicular, thinning out and becoming paler at the circumference. Apothecia wavy and elevated irregular and coalescing. disappearing finally into the general crust. Spores broadly ellipsoid, muriform, decolorate, monospermous in the thekes, $\frac{46}{13}$-$\frac{48}{15}$ mic.

On various barks San Luis Potosi, Mexico. Mr. C. G. Pringle, No. 222. A tropical *Graphis*, but well represented by the Mexican type.

GRAPHIS SUBELEGANS, Nyl. Thallus very thin, contiguous, marked by a broad crenulate brown hypothalline band, smooth, becoming somewhat roughened in age, from pale fuscous to a yellow olivaceous color. Apothecia elevated, well defined, difform, often occurring in stellate clusters, from brown becoming black and covered with a more or less delicate paler bloom. Spores ellipsoid to ovoid, muriform, pale yellow, $\frac{29}{11}$ $\frac{36}{12}$ mic.

On various close barks, San Luis Potosi, Mexico, Mr. C. G. Pringle, No. 162. A very beautiful species which is not likely to be confounded with any other.

GRAPHIS COMMA, Ach. Thallus somewhat leprous, diffused, circumscribed and limited by a well-defined brown, waving line indicated by the hypothallus, smooth, shining, from a dull white to an ashy leaden gray. Apothecia very short, small and comma-like, from straight becoming slightly curved, black. Spores plurilocular, fusiform, frequently bent, the spore-cells ranging from 10 to 13, decolorate, $\frac{38}{3}$-$\frac{40}{5}$ mic.

A very well-pronounced species suggesting an *Opegrapha*, occurring on *Ilex* at Jacksonville, Florida. Mr. W. W. Calkins, No. 216.

GRAPHIS BALBISINA, Nyl. Thallus adnate, leprous, diffused, marked by conspicuous serpentine ridges which divide the crust into segments but do not form areoles, from pale passing into an ashy or dull gray. Apothecia at first innate but becoming elevated, from short and simple advancing into irregular forms, anastomosing with branched divisions paler than the thalline structure. Spores long, fusiform, plurilocular; spore cells 12 to 14, decolorate ; $\frac{29}{62}$-$\frac{32}{72}$ mic.

A very beautiful Graphis, quite distinct and occurring on trunks in the mountains near Monterey, Mexico, Mr. C. G. Pringle, No. 118.

Piperaceæ Bolivianæ.

By Casimir de Candolle.

PIPER, L.

Sectio III. Steffensia, C. DC. (in Prodr. v. 16, 1, *p.* 251).

P. Bangii, foliis breviter petiolatis oblongo-ellipticis basi æquali acutis apice acuminatis acumine obtusiusculo utrinque glabris, nervo centrali ultra $\frac{4}{5}$ longitudinis nervos subpatulos parum arcuatos utrinque 8-10 mittente, petiolo glabro basi ima vaginante, pedunculo glabro petiolo æquilongo, bracteæ pelta triangulari margine breviter hirtella pedicello lato hirtello, antheris ovatis, ovario styloque glabris, stigmatibus minutis.

In Bolivia ad Yungas (Bang in Britt. et Rusb. exsicc. n. 380 in h. Boiss).

Ramuli glabri in sicco ad 4 millim. crassi nodis parum tumidis internodiis ad 5 centim. longis. Limbi in sicco membranacei creberrime pellucido-punctulati ad 20 centim. longi ad 7 centim. lati. Petioli ad 12 millim. longi. Amenta florentia ad 4 millim. crassa. Bracteæ pelta in sicco membranacea. Stamina 4 antheris filamenta paulo superantibus. Stylus ovario circiter æquilongus filiformis apice stigmatibus 3 minutis terminatus. Bacca verisimiliter stylifera sed in specimine nondum adulta.

Species *P. longifolii* Ruiz. et Pav. certe affinis, foliis brevioribus nervisque lateralibus minus numerosis ab ed discrepans.

PEPEROMIA, RUIZ ET PAV.

P. Brittonii, foliis ternis longiuscule petiolatis basi rotundatis apice obtuse acuminatis supra pilosulis subtus glabris 5-nerviis, amentis terminalibus axillaribusque longiuscule pedunculatis filiformibus glabris ipsis limbos superantibus haud densifloris, bractea suborbiculari subsessili, filamentis adultis antheras multum superantibus, ovario puberulo sessili apice in stylum oblongum desinente, stigmate terminali.

In Bolivia ad Yungas (Bang in Britt. et Rusb. exsicc. n. 329 in h. Boiss).

Herbe caule glabro basi radicante in sicco membranaceo subpellucido. Limbi in sicco tenuiter membranacei pellucidi circiter 20 millim. longi. Antheræ rotundatæ. Filamenta adulta ovario æquilonga. Ovarium inferne ovatum sub stylo haud contractum.

P. STUBELII, foliis quaternis brevissime petiolatis oblongo-spathulatis junioribus utrinque subtiliter retrorsum puberulis dein glabratis, nerviis 3 inconspicuis, pedunculis petiolos superantibus, bractea elliptico-orbiculari centro subsessili, ovario emerso apice imo stigma carnosulum gerente.

In Bolivia ad Yungas, bajada al Rio Chumunayo altitud. 1800 m., Decembri florens (Stübel n. 42 in h. Hieronymi).

Verisimiliter erecta ramulis retrorsum puberulis circiter 4 mill. crassis. Limbi basi cuneati apice rotundati, in sicco coriacei albicantes opaci, ad 5 centim. longi ad 12 millim. lati. Petioli vix 5 millim. longi. Amenta adhuc juvenilia densiflora, quam limbi breviora.

Botanical Notes.

Acer saccharinum, L. (Acer dasycarpum, Ehrh.) along the Passaic River in New Jersey.—Last September, while collecting along Dundee Lake, I found a maple, which, judging from the foliage, I took to be the above named species. The tree was growing on a small island a few hundred feet from the Bergen County shore. In the New Jersey Catalogue this maple had only been reported from Sussex County and the Delaware Valley. Before reporting this new locality I desired to collect the fruit. This I did this spring. The tree proves to be what I first thought it was. I have since made a careful search, and have found a number of trees growing on the Passaic County side also.

I reported the matter to Dr. Britton, and he replied, saying he had also found it growing in abundance along the Hackensack River last fall. If a search were made it would undoubtedly turn up in other parts of eastern New Jersey.

GEO. V. NASH.

CLIFTON, N. J., July 11, 1892.

Interior Shoots in Potato Tubers.—One of my fellow professors gave me a good-sized potato the other day, which upon splitting open he had found to contain another of about the size of a grape-shot. From this second proceeded a shoot of some length which again was contained within the original or mother tuber. My informant gave me to understand that he had a number of similar potatoes. Explanations are in order.

In this connection I will add that I have been surprised to see of late in "Nature" letters concerning double Messina and Valentia oranges. I had supposed this to be a familiar observation.
W. WHITMAN BAILEY.

BROWN UNIVERSITY, June 13, 1892.

The American Association for the Advancement of Science will hold its annual meeting at Rochester, New York, beginning August 17th, and continuing for a week. It will be an important meeting for the botanists, because the question of dividing Section F—Biology—into two, one of Botany and one of Zoology, will come up for action. It is very desirable that all botanists who can attend will do so, and that they will present much good matter before the Section and the Botanical Club of the Association, which will hold frequent sessions during the meeting.

Index to Recent Literature Relating to American Botany.

Agave Engelmanni, n. sp. Wm. Trelease. (3d Ann. Rep. Missouri Bot. Gard. 167–168, Plate 55).

Albinos Among Orchids. J. F. Collins. (Gard. & For. v. 299). The white form of *Habenaria psychodes* is reported from North Anson Village, Maine.

American Ashes—The. Geo. B. Sudworth. (Hardwood, i. No. 10).

Aphelandra tetragona, var. *imperialis.* H. Gærdt and L. Wittmack. (Gartenflora, t. 1354).

Arundinella—Sur les Characteres des. H. Baillon. (Bull. Mens. Soc. Linn. Paris, i. 1023, 1024).

Asclepias glaucescens and A. elata—Notes on. J. N. Rose. (Bot. Gaz. xvii. 193).

Asplenium montanum. (Meehan's Monthly, ii. 97, with colored plate).

Begonia Baumanni. L. Wittmack. (Gartenflora, t. 1348). A new species from Bolivia.

Boltonia latisquama. (Gard. & For. v. 268 illustrated).

Cathestechum—Sur l'organisation du Genre. H. Baillon. Bull. Mens. Soc. Linn. Paris, i. 1028–1030).

Champignons parasites de la Vigne—Sur quelques. P. Viala et

C. Sauvageau. (Ann. de l'Ecole Nat. D'Agric. de Montpellier vi. 135–151; two plates).

Pyrenochæta Vitis, *Phoma Farlowiana*; *Coniothyrium Berlandieri* and *Diplodia sclerotiorum* and described as new and figured.

Coryanthes macrantha. A. Bode. (Gartenflora, xl. 152–154, figs. 44, 45).

Etude sur le genre Eustichia (Brid.) C. Mueller. Emile Bescherelle. (Journ. de Bot. vi. 177–186.)

The genus *Bryoziphium*, Mitt. is adopted for the species of the northern hemisphere, and three are recognized, *B. Norvegicum*, Mitt. *B. Savatieri*, (Husn.) Mitt. and *B. Mexicanum*, Besch, the latter separated from *B. Norvegicum*, to include Liebmann's specimens from Mexico and Bourgeau's No. 1333.

E. G. B.

Flora of Mt. Desert Island, Maine—Fourth Annual Supplement to the Preliminary List. Edward L. Rand. (Hectograph print, pp. 7, Cambridge, Mass. 1892).

This contains: A list of additions to the Phanerogamia and Pteridophyta, a list of species to be dropped from previous catalogues, a list of the Hepaticæ, determined by Prof. Underwood including *Diplophyllum albicans* here first reported from the United States, one of additional Bryophyta, determined by Herr Warnstorf and Dr. Barnes, and one of additional Algæ, determined by Mr. Collins and Mr. Holden.

Flora of Washington, D. C.—Third List of Additions. Theodor Holm. (Proc. Biol. Soc. Washington, vii. 105-132).

This list, covering the period from April 1886 to April 1892, is supplemental to Professor Ward's "Guide" of 1881, and the subsequent lists of 1885 and 1886. In it are recorded many additional species and new localities for the rarer ones of the region. *Althæa cannabina*, found by Mr. Oliver, escaped from cultivation in vacant lots south of the capitol, and *Brunella laciniata* collected by Mr. Coville near Aqueduct Bridge, appear to be here first reported from America.

Flowers and Insects.—VIII. Charles Robertson. (Bot. Gaz. xvii. 173).

The insects that visit *Isopyrum biternatum*, *Sanguinaria Canadensis*, *Baptisia leucophæa*, *Trifolium pratense*, *Heuchera hispida* and *Lythum alatum* are noted.

Forestry for 1891—*Report of the Chief of the Division of.* B. E. Fernow. (Washington, 1892).

A prominent place is given in the above pamphlet to the report on Southern Lumber Pines, *Pinus palustris*, Mill., *Pinus Cubensis*, Grisb., *Pinus echinata*, Mill. and *Pinus Tæda* are illustrated and their geographical distribution is indicated on maps prepared by Chas. Mohr.

Gramineé uniflore—Un. H. Baillon. (Bull. Mens. Soc. Linn. Paris, i. 1034-1036).

Notes on *Aciachne pulvinata*, Benth of the Bolivian Andes.

Grasses of Tennessee—Part i. F. Lamson Scribner. (Bull. Agri. Exper. Station Univ. Tenn. v. No. 2, p.p. 29-119, illustrated).

Professor Scribner has issued a most important paper on the grasses of Tennessee, and one which cannot fail to be of great service to the people of that State. It consists of an annotated list of the native and cultivated species, arranged alphabetically, local and common names being given in detail, in which many of the genera are illustrated. A chapter is devoted to descriptive terms, also freely illustrated, one to the general characters of the order Gramineæ with an exceedingly useful key to the genera, and another to a list of books and papers consulted.

Grasses—Some depauperate. A. S. Hitchcock. (Bot. Gaz. xvii. 194).

Hypericum opacum. C. S. Sargent. (Gard. & For. v. 304, illustrated).

Hyphomycetes—Two New Genera of. A. P. Morgan. (Bot. Gaz. xvii. 190).

Cylindrocladium scoparium and *Synthetospora electa* are described and illustrated.

Lejeuneæ—The North American. F. Stephani. (Bot. Gaz. xvii. 170).

Two new species are described, *Micro-Lejeunea Cardoti* from Louisiana and Mexico and *Eu-Lejeunea Underwoodii* from Florida.

Life Histories of Plants, No. vii.—Contributions to the. Thos. Meehan. (Proc. Acad. Nat. Sci. Phila. 1892, 160-171 reprinted).

Interesting and suggestive notes "On the Vitality of some Annual Plants," "On Self-pollination in *Amsonia Tabernæmontana*," "On a special form of Cleistogomy in *Polygonum acre*," "On the Direction of Growth in Cryptogamic Plants," "Tricarpellary Umbellifers," "A Mode of Variation in *Stellaria media*," "On the Sexes of the Holly," "On the Stamens of *Ranunculus abortivus*," "On the Character of the Stamens in *Ornithogalum umbellatum*." and "Note on *Barbarea* in connection with Dichogamy."

Loasaceen—Die Blüthenstände der. I. Urban. (Ber. Deutsch. Bot. Gesell. x. 220-225, t. 12).

Loasaceen—Blüthen und Fruchtbau der. I. Urban. (Ber. Deutsch. Bot. Gesell. x. 259-266, t. 14).

Marchantia polymorpha—The Life History of. L. W. Waechter. (Manchester Mic. Soc. Trans. and Annual Rep. 1891, 56 plate III).

Masdevallia biflora. E. Regel. (Gartenflora, t. 1341, f. 2).

A new species from Brazil.

Masdevallia leontoglossa. (Bot. Mag. t. 7245).

Native of New Grenada.

Masdevallia macrochila. E. Regel. (Garten flora, t. 1344).

A new species from New Grenada.

Missouri Botanic Garden—The. (Am. Gard. xiii. 403, illustrated).

Nectar of the Poinsettia—Chemical Composition of the. W. S. Stone. (Bot. Gaz. xvii. 192).

Nomenclature—On. Sereno Watson. (Bot. Gaz. xvii. 169).

Noticias sobre la Flora de Cacahuamilpa y Plantas colectadas por el Dr. Fernando Altamirano. M. Villada. (Mem. Soc. Cient. Antonio Alzate, v. 213-218).

An account or the plants collected by Dr. Altamirano at Cacahuamilpa, Mexico, with a plate of *Breweria Mexicana*, var., *floribunda*, Villada, the same as published in a recent issue of La Naturaleza.

Notylia—Sur l'organisation florale d'un. H. Baillon. (Bull. Mens. Soc. Linn. Paris, i. 1039-1040).

Officinelle Alstrœmeriaceen, Agaven und Xyridaceen Brasiliens. Theodore Peekholt. (Pharm. Rund. x. 162).

The various uses and medicinal qualities of the following Brazilian plants are noted: *Bomarea salsilloides, B. spectabilis, Alstrœmeria cunha, A. monticola, A. caryophyllea, Agave Americana, Fourcroya gigantea, F. Cubensis, Xyris laxifolia, X. pallida,* and *Abolboda Brasiliensis.*

Oncidium Phalænopsis. Wm. Hugh Dower. (The Garden xli. 492, with colored plate).

Opizia—La Fleur femelle de. H. Baillon. (Bull. Mens. Soc. Linn. Paris, i. 1037-1039).

Oregon Weeds and How to Destroy Them—Some. Moses Craig. (Oregon Agric. Ex. St. Bull. No. 19, 1892).

Illustrations are given of *Sonchus oleracea, Madia sativa, Anthemis Cotula, Verbascum Thapsus, Gilia squarrosa, Cnicus arvensis, Pteris aquilina, Avena fatua, Erodium cicutarium, Chrysanthemum Leucanthemum, Cnicus lanceolatus, Arctium Lappa, Plantago lanceolata, Rumex crispus, Rumex Acetosella, Amarantus retroflexus, Chenopodium album, Bromus secalinus* and *Agropyrum repens.*

Oreopanax Sanderianum. H. Botting Hemsley. (Gard. Chron. xi. 718).

The description of the *Oreopanax* spp. 19 and 20 of the Biologia Centrali-Americana Botany i. p. 575.

Parmelia molliuscula, Ach.—The Fruiting of. Thomas A. Williams. (Ann. Rep. of the Miss. Bot. Garden iii. May, 1892; pp. 169-170 t. 57).

This lichen, heretofore reported as always sterile, has been found fruiting in the collections of Dr. Engelmann, collected in the Black Hills in 1856, by Dr. H. Engelmann.

Peach Yellows—The Chemistry of. Erwin F. Smith. (Proc. Am. Pom. Soc. for 1891, reprint).

Phyllocactus crenatus. A. Reichard. (Gartenflora, t. 1347).

Plants of the Pribilof Islands, Behring Sea. C. Hart Merriam. (Proc. Biol. Soc. Wash. vii. 133-150).

This account of the flora of the seal islands is only too brief for the interest it awakens, 92 species of Phanerogams, 4 Pteridophytes and 37 Bryophytes being enumerated. Critical notes by J. M. Rose are given on the following species: *Chrysosplenium alternifolium* (?), *Epilobium anagallidifolium*, *Artemisia Norvegica*, var. *Pacifica*, and *A. vulgaris*, var. *Tilesii*. Dr. Merriam adopts the ornithological nomenclature with three names, but is puzzled what to do with the *Sphagnums* named by Warnstorf when they have four names. E. G. B.

Poa annua—Les Glumellules du. H. Baillon. (Bull. Soc. Linn. Paris i. 1034).

Poplars—American. (Gar. & For. v. 277).

A full page illustration is given of a group of *Populus trichocarpa* in the Yosemite Valley.

Prosartes Hookeri—Les Fleurs du. H. Baillon. (Bull. Mens. Soc. Linn. Paris i. 1031, 1032).

Rhipsalis trigona. G. A. Lindberg. (Gartenflora xl. 38, 39, figs. 15, 16).

Romneya Coulteri. (Gartenflora t. 1359).

Stanhopea graveolens, var. *Lietzei.* E. Regel. (Gartenflora t. 1344).

Synandrospadix vermitoxicus. (Bot. Mag. t. 1242).

Illustration of a large Aroid of the Argentine Republic.

Systematische Gruppirung der Pflanzen—Die. H. Hoffman. (Pharm. Rund. x. 164).

A detailed list with dates of methods of plant classification beginning with the Linnæan classification in 1735 and ending with Engler's in 1892.

Taxodium distichum. H. Rottenheusser. (Gartenflora xl. 239-241, figs. 56, 57).

Description and illustrations of the tree and its knees.

Tillandsia Lorentziana. L. Wittmack. (Gartenflora t. 1349).

Tillandsia punctulata. L. Wittmack. (Gartenflora xl. 208, 209, figs. 51, 52).

Transpiration, or the Loss of Water from Plants. C. E. Bessey and A. F. Wood. (Proc. Amer. Assoc. Adv. Sci. xl. 305-308; reprinted as Contr. Bot. Dept. Univ. Nebr. N. S. iv.).

A concise account of the results of recent and early investigation of this subject.

Trees in Winter—The identification of. Aug. F. Foerste. (Bot. Gaz. xvii. 180, with two plates).

Vegetable Pathology—Report of the Chief of the Division of. B. T. Galloway. (Washington, 1892).

With illustrations of *Ceratocystis fimbriata*, the Sweet Potato Black Rot.

Vriesia regina. L. Wittmack. (Gartenflora xl. 160-162, figs. 46, 47).

Waluewa pulchella. E. Regel. (Gartenflora t. 1341, f. 1).

A new genus and species of Orchid from Brazil.

Yucca—Detail Illustrations of. Wm. Trelease. (3d Ann. Rep. Missouri Bot. Gard. 159-166, Plates 44-54).

A general description of the genus with a list of the species as recognized by the author, most of them illustrated.

Yukon District—An Expedition Through. Charles Willard Hayes. (National Geographic Magazine iv. 117-162, Plates 18-20).

An appendix of two pages contains a list of Lycopodiums, mosses, hepaticæ and lichens determined by Miss Cummings.

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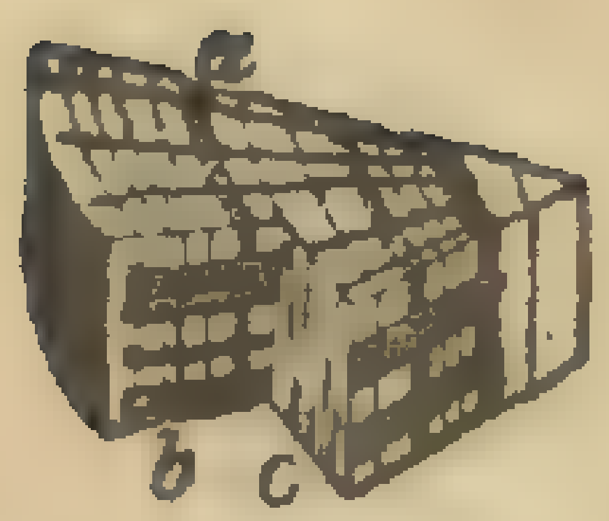

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VOL. XIX. SEPTEMBER, 1892. NO. 9.

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OF THE
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NATHANIEL LORD BRITTON,

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CONTENTS:

PAGE.
An Enumeration of the Plants collected by Dr. H. H. Rusby in South America, 1885-1886.—XXI: *N. L. Britton*.......... 263
On the Casting-Off of the Tips of Branches of Certain Trees (Plate CXXXII : *Aug. F. Foerste*.............. 267
The Hepaticæ of Labrador: *Lucien M. Underwood* 269
An Extract from the Diary of Prof. J. W. Bailey: (Communicated by *Prof. W. W. Bailey*)............ 271
BOTANICAL NOTES.—*Monarda Clinopodia*, L.: *Frank E. McDonald*; Proposed Nomenclator Bryologicus............. 273
RECENT LITERATURE RELATING TO AMERICAN BOTANY.—Bartram's Oak; Botanical Names of the U. S. Pharmacopœia; Catalogue of Canadian Plants, Part VI, Musci; Studies in the Compositæ; Cultivated Native Plums and Cherries; Description of New Plants from the Botanical Garden of St. Petersburg; Fungi from Brazil; Certain California Labiatæ; Leguminosæ of Ecuador and New Grenada: Remarks on Certain *Pentstemons*; Phenomena and Development of Fecundation: Second Edition of the Portland Catalogue of Maine Plants; Contributions to the Flora of Costa Rica; Second Edition of Webber's Appendix to the Flora of Nebraska; Silva of North America, Vol. IV., and briefer notices. .... [illegible]
Proceedings of the Botanical Club, A. A. A. S., Rochester Meeting, August, 1892. [illegible]
Titles of Botanical Papers presented before the Section of Biology, A. A. A. S., Rochester Meeting, August, 1892... [illegible]

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The Club meets regularly at Columbia College, 49th Street and Madison Avenue, New York City, on the second Tuesday and last Wednesday of each month, except July, August and September, at 8 o'clock, P.M. Botanists are cordially invited to attend.

Members of the Club will please remit their annual dues for 1892, now payable, to Mr. Henry Ogden, Treasurer, 11 Pine St., New York City.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XIX.] New York, September 10, 1892. [No. 9.

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XXI.

(Continued from page 151.)

Liabum hastifolium, Poepp. & Endl. Yungas, 4,000 ft. (1742); 6,000 ft. (1743).

I brought these plants home from Kew with this name taken from Spruce's No. 4073 in the Kew Herbarium, but I now fail to find it published. They are the same as this specimen of Spruce, and related to but not identical with Mandon's No. 240 from Sorata, given in Bull. Soc. Bot. France xii. 81, as *L. corymbosum*, Sch. Bip.

LIABUM OVATUM (A. Gray). *Paranephelius ovatus*, A. Gray. Sorata, 13,000 ft. (1633). The same as Mandon's No. 239 from the same locality.

LIABUM HASTATUM (Wedd.). *Munnozia hastata*, Wedd. Chlor. And. i. 211, note. Yungas, 6,000 ft. (1744).

LIABUM RUSBYI, spec. nova. Caule folioso, pubescente, 30+ cm. alto; foliis breviter petiolatis, lanceolatis, apice basique acutis, serratis, 6-10 cm. longis, 1.5-3.5 latis, superne glabris et intense viridibus, subtus dense albo-tomentosis; capitulis corymbosis, pedunculatis, 3-4 cm. latis; involucro hemisphericо, bracteis 3-5-seriatis, triangulari-lanceolatis vel ovatis, acuminatis, puberulentis ciliatisve; radiis augustis disco duplo superantibus; acheniis glabris, 1 mm. longis; pappus sordidus, rigidus 8-10 mm. longis.

Mapiri, 10,000 ft. (1745).

Erechthites valerianæfolia (Wolf), DC. Prodr. vi. 295. Mapiri, 5,000 ft. (1671).

Senecio multinervis, Sch. Bip. Bull. Soc. Bot. Fr. xii. 80, name only. Yungas, 4,000 ft. (1640); Unduavi, 8,000 ft. (2,128). The same as Mandon's 142. Schultz remarks that this is related to *S. castaneæfolius*, DC., a species which I have not seen.

Senecio clivicolus, Wedd. Chlor. And. i. 130. Near La Paz, 10,000 ft. (1679, 1681); Unduavi, 8,000 ft. (1670). The same as Mandon's 140.

Senecio volubilis, Hook. Tacna, Chili (1696).

Senecio Bridgesii, H. & A. Valparaiso, Chili (1675).

Senicio culcitoides, Sch. Bip. Bonplandia, 1856, 55, name only. Wedd. Chlor. And. i. 103. Unduavi, 8,000 ft. (1692).

Senecio formosus, H.B.K. Nov. Gen. iv. 177. Mapiri, 5,000 ft. (1672).

Senecio vulgaris, L. Sp. Pl. 1216. Near La Paz, 10,000 ft. (1674).

Senecio attenuatus, Sch. Bip. Bull. Soc. Bot. Fr. xii. 80, name only. Near La Paz, 10,000 ft. (1717). The specimens of this species were inadvertently distributed as from Tacna, Chili. Same as Mandon's 139.

Senecio attenuatus, Sch. Bip., var. MICROPHYLLUS, var. nov. Foliis spatulatis-oblongis, acutis, 4-6-dentatis, 1-1.5 cm. longis, 3-4 mm. latis. Near La Paz, 10,000 ft. (1691).

rb Phil. 5 U.S. Nat. H.

SENECIO YUNGASENSIS, sp. nov. Suffruticosus, valde ramosis, caulibus 6-8 dm. altis, puberulentis; foliis sessilibus, oblongis, apice acuminatis, basis augustis, utrinque puberulentis, denticulatis, 10-15 cm. longis, 3-5 cm. latis; capitulis radiatis, pedunculatis, numerosis, paniculatis, 1.5-2.5 cm. latis; involucro hemispherico, bracteis sub 2-seriatis, oblongo-lanceolatis, puberulentis, acutis, margine scariosis; radiis oblongis, obtusis, disco superantibus; acheniis glabris, oblongis, 1-5 mm. longis; pappus albidus, 5 mm. longus.

Yungas, 4,000 ft. (1719). Related to *S. myriocephalus*, Baker, of Brazil.

× SENECIO FLOSCOSUS, sp. nov. Herbaceus, carnosus, caulibus superne tomentosus, 5-7 dm. altus; foliis utrinque glabris, petiolatis, ovato-oblongis, apice basique acutis, integris, 8-10 cm. longis, 3-4 cm. latis; capitulis numerosis, dense corymbosis, pedunculatis, radiatis, 2-3 cm. latis; involucro anguste campanulatis, bracteis sub 2-seriatis, lineari-oblongis, acutis, tomentosis, margine scariosis; radiis disco sub-duplo longior-

× = Senecio floccosus Britton

ibus; acheniis glabris, 2 mm. longis; pappus copiosus, albidus, 1 cm. longus.

Near La Paz, 10,000 ft. (1680); Unduavi, 8,000 ft. (1720).

SENECIO SPRUCEI, sp. nov. Fruticosus, scandens, caule parce ramoso, tomentoso, striato, 1 m.+longo; foliis petiolatis, ovatis, integris, apice acutis, basi rotundis vel truncatis, superne glabris, subtus tomentosis, 6-10 cm. longis, 3-6 cm. latis; petiolis 2 cm. longis; capitulis paucis, paniculatis, sessilibus, eradiatis, 4 mm. latis; involucro auguste campanulatis, bracteis oblongis, acutis obtusisve, glabratis, 3 mm. longis; acheniis pubescentibus, 1 mm. longis; pappus albidus, 3 mm. longis.

Yungas, 4,000 ft. (1695). The same as Spruce's No. 4811 from Tavalosus, Herb. Kew., except that that specimen has longer petioles. Related to Lechler's 2608 from Peru. = S. Brittonianus

Gynoxys alternifolia, Sch. Bip. Bull. Soc. Bot. Fr. xii. 80, name only. Yungas, 4,000 ft. (1639). The same as Mandon's 131.

Gynoxys laurifolia (H.B.K.), Cass. Dict. xlviii. 435. Sorata, 10,000 ft. (1638).

Gynoxys baccharoides (H.B.K.), Cass. Dict. xlviii, 455. Unduavi, 8,000 ft. (1676). The same as Mandon's 84, called *G. Mandoni* by Schultz.

Werneria pygmæa, H. & A., Journ. Bot. iii. 348. Near La Paz, 10,000 ft. (2520).

Centaurea Militensis, L. Sp. Pl. 1297. Near Valparaiso, Chili (1554).

Barnadesia polyacantha, Wedd. Chlor. And. i. 13. Unduavi, 8,000 ft. (1552); Sorata, 10,000 ft. (1553). The same as Mandon's No. 4.

Mutisia subulata, R. & P. Syst. 193, Near Valparaiso, Chili (1548).

Mutisia viciæfolia, Cav. Ic. v. 62, t. 490. Near La Paz, 10,000 ft. (1550); Yungas, 4,000 ft. (1551).

Mutisia Bipontini, Mandon, Bull. Soc. Bot. Fr. xii. 79, name only. Yungas, 6,000 ft. (1549). The same as Mandon's No. 6.

Chuquiragua oppositifolia, Gill. et Don. Phil. Mag. 1832, 392. Near La Paz, 10,000 ft. (1555); Unduavi, 8,000 ft. (1556).

CHUQUIRAGUA FEROX (Wedd.). (*Flotowia ferox*, Wedd. Chlor. And. i. 5.) Near La Paz, 10,000 ft. (1558) The same as Mandon's No. 2.

LYCOSERIS BOLIVIANA, sp. nov. Fruticosus, ramosus, caule parce tomentoso, ramulis striatis; foliis oblongis, sessilibus, acutis vel acuminatis, denticulatis, 4-nervis, superne glabris et intense viridibus subtus parce tomentosis, 8-12 cm. longis, 2-4 cm. latis; capitulis ad apices ramorum solitaribus, 6-8 cm. latis; involucro hemispherico, bracteis sub 7-seriatis, ovatis vel lanceolatis, acutis, puberulentis; radiis brevibus, apice dentatis; acheniis oblongis, glabris, 2 mm. longis; pappus ochroleucus, glabris, 1.5 cm. longis.

Guanai, 2,000 ft. (1557). Sterile heads not seen.

Chaptalia nutans (L.), Hemsley, Bot. Biol. Centr. Amer. ii. 255. Mapiri, 5,000 ft. (1677); Yungas, 6,000 ft. (1351).

Chaptalia integrifolia (Cass.), Baker in Mart. Fl. Bras. vi. Pars. III. 378. Yungas, 6,000 ft. (1678).

Proustia pungens, Poepp. in Less. Syn. 110. Near La Paz, 10,000 ft. (2680).

Perezia multiflora (H. & B.), Less. Linnæa, 1830, 15. Unduavi, 12,000 ft. (2668).

Perezia pungens (H. & B.), Less. Linnæa, 1830, 20. Yungas, 6,000 ft. (1725). The same as Mandon's 25, regarded by Schultz as a variety.

Trixis divaricata (H.B.K.), Spreng. Syst. iii. 501. Guanai, 2,000 ft. (1699). A form similar to *T. calcarea*, Gardn.

Jungia floribunda, Less. Linnæa, 1830, 38. Yungas, 4,000 ft. (1708). A form or variety the same as Lechler's No. 2126 from Peru.

HIERACIUM MANDONI (Sch. Bip.). (*Pilosella Mandoni*, Sch. Bip. Bull. Soc. Bot. Fr. xii. 82, name only.) Sorata, 13,000 ft. (1651). The same as Mandon's 271.

HIERACIUM TRICHODONTUM (Sch. Bip.). (*Pilosella trichodonta*, Sch. Bip. Bull. Soc. Bot. Fr. xii. 82, name only.) Unduavi, 8,000 ft. (1654). The same as Mandon's 270.

Hieracium microcephalum, Sch. Bip. Bonplandia, 1856, 55. Mapiri, 10,000 ft. (1652). The same as Lechler's 1820 from Peru.

On the Casting-Off of the Tips of Branches of Certain Trees.

BY AUG. F. FOERSTE.

(PLATE CXXXII.)

The growth of the branches of trees for each year ceases at widely different periods. Some trees continue growth until they are "killed back" by the early frosts of autumn. Others develop terminal scaly buds, often quite early in spring, and thus have the extent of their growth determined long before extraneous causes tend to check their development. The time at which terminal buds are formed varies widely in different species, but it is well known that before the end of May most trees have terminated the yearly growth of their branches in this way. A small percentage of our trees have, however, developed the curious habit of securing determinate growth, by casting off the tips of their branches at well formed joints. The scars left at these joints are usually smooth, and may readily be distinguished from leaf-scars by the fact that the fibro-vascular tissues do not form bundles, and appear as little protuberances in the scar, as is the case with most leaf-scars. Instead, the fibro-vascular tissues form a more or less circular figure, following the outline of the scar, as might be expected, since they represent the fibro-vascular tissues between the wood-layers and the bark proper. In *Catalpa speciosa*, Warder, this terminal scar may be seen on the lower sides of the branches (Fig. 2). The leaf-scars and the corresponding leaves are usually smaller here than on the upper side of the branch (Fig. 1) on the more mature twigs, although the leaves of each whorl are all similar during their early history. *Staphylea trifolia*, Linn. shows a terminal scar (Fig. 3), in some cases almost hidden between the two upper lateral buds. *Ailanthus glandulosus*, Desf. also has a terminal scar (Fig. 5). All the branches of the same tree do not cast off their tips, even in cases where part of the branches may almost invariably be expected to have done so. This is well shown by various species of *Æsculus* for instance, *Æsculus Hippocastanum*, Linn., where a part of the tips have been cast off, leaving exceedingly well-marked and evident terminal scars (Fig. 4), whereas almost all twigs of less vigorous growth, and some of those most normal in type, have become determinate in the usual way by means of terminal scaly buds. Certain species of trees, however, show a remarkable uniformity regarding the casting off of the tips of all their branches. Thus in case of *Tilia platyphyllos*, Scop., it was necessary to search for several hours during the last days of May, in order to secure the few specimens from which Fig. 7 was prepared, and all of these showed that another week would have witnessed the casting off also of these remaining tips (at *a* in the figure). Our American linden, *Tilia Americana*, Linn., also shows terminal scars (Fig. 6). It must not be supposed however, that all the tips of branches thus cast off are in as advanced a stage of development as those figured in the case of the European linden. Thus in the case of a European species of elm, the cast-off tips were small, none of the internodes of these tips being more than a few millimeters in length. A terminal scar is also shown by *Ulmus Americana*, Linn. (Fig. 8).

Of course the time at which the casting off of the tips takes place varies widely in different species. Thus during the last week of May it was found impossible to find tips of branches in the case of *Æsculus Hippocastanum* which had not been cast off, where such an operation was at all probable. All remaining branches had terminal scaly buds already formed. *Tilia platyphyllos* had also already cast off its tips, but three or four were still found in situ, although the plane of separation or joint had already been formed. *Ulmus campestris*, Linn., on the other hand, had lost only a third of its tips, although the plane of separation was becoming evident in the remainder. *Catalpa speciosa* had not yet reached a sufficiently advanced growth of its branches to give any indication of the future separation of its tips.

It may be of interest in this connection to mention that quite a number of trees and shrubs do not cast off their tips, nor form terminal scaly buds, nor are they "killed back" by frosts, but the tips of the branches simply wither and remain attached to the stem. *Diospyros Virginiana*, Linn., has been figured as a case of such a plant (Fig. 9). In certain shrubs this withering takes place in spring.

The casting off of the tips of branches may be looked upon as simply another solution of the problem how to secure determinate growth of branches, and thus obviate the useless expenditure of energy displayed by trees whose branches are always killed back by winter frosts. All the time which elapses between the formation of terminal scaly buds, or the casting off of the tips of branches, and the first frosts of autumn, may be looked upon as a period of preparation for the few weeks of active growth of the next season.

The Hepaticæ of Labrador.

By Lucien M. Underwood.

During the past three years Rev. Arthur E. Waghorne, of Newfoundland, has been sending large numbers of packets of Newfoundland Hepaticæ for examination, and has made a large number of additions to the only published list* from that province. The examination of this series had been interrupted, and a full report of the Newfoundland species cannot yet be given; this will follow later.

During August of last year (1891) Mr. Waghorne took a short trip to the coast of Labrador, and as one of the results has sent over a hundred packets of liverworts for determination. With the exception of a few species from this coast sent me by Mr. O. D. Allen in 1887, these are the only ones yet reported from that region. While the list contains mostly species that would be expected from this locality, one or two species are of interest as having no definite location to which they could be assigned. This is particularly true of *Harpanthus Flotovianus*, which was described in the revised Manual as "certainly extra-limital" without my knowledge or approval. I have reason to believe it will be found in our Northern States, particularly in mountain regions.

I append the list as follows:

JUNGERMANIACEÆ.

1. *Blepharostoma trichophyllum* (L.), Dumort.
2. *Cephalozia bicuspidata* (L.), Dumort.
3. *Cephalozia divaricata* (Sm.), Dumort.
4. *Cephalozia fluitans* (Nees), Spruce.

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* Flora Miquelonensis, 1888.

5. *Cephalozia multiflora*, Spruce.
6. *Chiloscyphus polyanthos* (L.), Corda.
7. *Diplophyllum taxifolium* (Wahlenb.), Dumort.
8. *Gymnomitrium concinnatum* (Lightf.), Corda.
9. *Harpanthus Flotovianus*, Nees.
10. *Harpanthus scutatus* (Web.), Spruce.
11. *Jungermania attenuata* (Mart.), Lindenb.
12. *Jungermania barbata*, Schreb.
13. *Jungermania cordifolia*, Hook.
14. *Jungermania excisa*, Dicks.
15. *Jungermania inflata*, Huds.
16. *Jungermania lycopodioides*, Wallr.
17. *Jungermania minuta*, Crantz.
18. *Jungermania quinquedentata*, Thed.
19. *Jungermania setiformis*, Ehrh.
20. *Jungermania sphærocarpa*, Hook.
21. *Jungermania ventricosa*, Dicks.
22. *Kantia trichomanis* (Dicks.), S. F. Gray.
23. *Liochlæna lanceolata* (L.), Nees.
24. *Marsupella emarginata* (Ehrh.), Dumort.
25. *Mylia Taylori* (Hook.), S. F. Gray.
26. *Pellia epiphylla* (L.), Corda.
27. *Pellia endiviæfolia* (Dicks.), Dumort.
28. *Ptilidium ciliare* (L.), Nees.
29. *Plagiochila interrupta* (Nees.), Dumort.
30. *Scapania undulata* (L.), Dumort.

MARCHANTIACEÆ.

31. *Marchantia polymorpha*, L.

Of the above species all except Nos. 8, 9, 13, 16, 19, 20 and 26 are more or less common species of New England. Nos. 8 and 20 are found in our higher mountain regions. Twenty-two are among the sixty-one species known from Greenland,* the numbers not yet reported from that more northern province being 4, 5, 10, 12, 14, 20, 25, 26 and 27. All are common European species, and two-thirds are also reported from Asiatic Russia.

MAY 25, 1892.

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* Joh. Lange: Meddelelser om Gronland. Tredie Hefte 407-421 (1887).

An Extract from the Diary of Prof. J. W. Bailey.*

WEST POINT, May 21st, 1835.

Be this day ever remembered! for on it I first became acquainted with a scientific botanist, and he, too, the first in America; in short no less a person than the distinguished Dr. John Torrey, of New York. I was introduced to him at the hotel by Lieut. Mather. I was much surprised to find him so young a man. After conversing awhile he proposed a botanical excursion, and we proceeded down the hill behind the hotel, collecting *Corydalis aurea*, *Cardamine Virginica*, *Celtis occidentalis*, etc.; we were, however, soon driven in by the rain. We adjourned to my room, where we held a conversation on botany, which to me was highly interesting. He says that the plant called *Gaultheria hispida* is no *Gaultheria*, but a new genus having the fruit of an *Oxycoccus* and flower of *Vaccinium*. (This refers to *Chiogenes hispidula*, T. & G. It was called *Gaultheria hispidula* by Muhl., W. W. B.) He mentioned some anecdotes of Prof. Lindley; among others, the fact that the "Outline of the First Principles of Botany" was wholly written on his journey to and from his residence, about six miles from London. When the stage stopped at an inn, Lindley would write on a scrap of paper a sentence or two of the work, using his hat as a desk. This was but one instance of the constant devotion and industry of the professor.

MAY 22d, 1835.—This day being very fine, Dr. Torrey and myself made a short botanical excursion among the rocks (from the hotel around to Kosciusko's Garden). He pointed out the *Lycopodium* . (In a note after *Lycopodium rupestre* in my father's copy of Bigelow's "Plants of Boston," he says: "West Point, May 22d, 1835, pointed out to me by Dr. Torrey." This fixes the plant as *Selaginella rupestris*, Spring., W. W. B.) I had not noticed it before. He also stated that he had found *Taxus* somewhere near Gee's Point. (The extreme or lighthouse end of West Point, W. W. B.) He related to me a curious and dangerous adventure that once happened to him. In company with a friend of his, during one of his journeys, he had attempted to follow a mountain path which had not been travelled upon since the spring freshets, and which had become covered with loose pebbles. He soon lost the path and suddenly found himself slipping. He called to his friend, who was in the same predicament, and advised him to lie down and attempt to stop himself with his extended hands and feet. They both lay down, but still found that they were slowly sliding. Torrey was ahead and could not stop himself till he reached the brink of a precipice of three hundred feet descent. Here he stopped, but the slightest movement would have caused him to go over. His friend had, by means of a knife, obtained a foot-hold, and was able to retain his position. Torrey asked him if he could possibly assist him, for he, Torrey, feared that he would soon slip. His friend replied that he could not leave his position to assist him, but if Torrey could give him anything to take hold of he might perhaps pull him up. Torrey took his handkerchief, wound it round his hand, and let the wind blow the end to his friend who caught it, and thus rescued the doctor from his perilous situation. They then, by means, I presume, of their knife (although the doctor did not explain this) succeeded in clambering up to a safe place. At the time the doctor thought of using his handkerchief his feet were actually hanging over the precipice, and so hazardous was his position that he did not dare raise his arm to reach his friend.

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* Communicated by Prof. W. W. Bailey.

The doctor mentioned some curious observations which he had made upon the *Campanula rotundifolia*. He had noticed that the plant bears in the early part of the season apetalous flowers often with tri-sepalous calyx, which he had carefully examined without perceiving any trace of stamens or pistils; yet, strange to say, these flowers perfected seed as in the usual flowers. He knew, however, that stamens and pistils in some form or other must be present, and, accordingly, on careful examination with a microscope he found the base of the interior of the flower was divided into five distinct divisions, and he soon found that the apparent base was really a membrane composed of five scales, under which the stamens and pistils were concealed. The doctor left in the steamboat for New York. His address is 30 McDougal Street.

Botanical Notes.

Monarda Clinopodia, L.—After many examinations based upon the growing plant, I am constrained to believe that *Monarda Clinopodia*, L., should be considered a variety of *Monarda fistulosa*, L. There is a marked difference in appearance between *M. Clinopodia* and typical *M. fistulosa*, but I think it occasioned solely by place of growth. Typical *M. fistulosa* is a lover of sunshine, preferring open, dry soil, and when growing in woods I have invariably found it where sunshine had access, while I have always found *M. Clinopodia* in the immediate vicinity of shady springs, it preferring moisture and shade. I have found the latter in locations of this kind, and a few rods distant away from the influence of shade would be its relative, *M. fistulosa*, in abundance. The difference in appearance is difficult to embody in language. It can be said that in *M. Clinopodia* the stem is more sharply angled, leaves broader and thinner, throat of calyx less bearded and corolla lighter in color than *M. fistulosa*, but is this sufficient for the limitation of a species? Such differences might justify varieties, but hardly species. It is well known that *M. fistulosa* is extremely variable, and I have collected specimens that clearly bridge over any of the differences between it and *M. Clinopodia*. FRANK E. MCDONALD.

Nomenclator Bryologicus. General Paris. (Rev. Bryol. xix., 41.) An appeal is made to all bryologists to send the author reprints or copies of descriptions of all new species of mosses that have been published since the issue of the last edition of Schimper's Synopsis Muscorum, and Müller's. A list of works consulted is given, and all omissions will be gratefully acknowledged. It is proposed to follow the plan of Steudel's Nomenclator, but on a more extensive scale, giving the synonymy more fully. Such a work is greatly needed. E. G. B.

Index to Recent Literature Relating to American Botany.

Bahama Islands—A Winter Visit to the. H. W. Wilson. (Trans. Mass. Hort. Soc. part i. 210, 1891; illustrated).

Bartram's Oak. A. Commons. (Bot. Gaz. xvii. 125, 126).

In this most recent contribution to the question of the status of this tree the author considers it as a variety of *Quercus imbricaria.* Without contributing any new facts to the argument, the opinion is expressed "that further investigation will confirm the conclusion here reached." Unfortunately, the geographical range of this species is such as almost to preclude the possibility of any connection between it and *heterophylla*, at least the distribution of the two trees is such that almost any other likely hypothesis ought to be considered before adopting this one which appeals so strongly to the improbable. The author mentions a tree found by him in Salem Co , New Jersey, which he refers to an entire leaved form of *heterophylla* (*imbricaria ?*). The specimens of this tree in the Herbarium of Columbia College are manifestly not *imbricaria* but *Rudkini*, as first determined by Dr. N. L. Britton when submitted to him. So far as can be ascertained no *imbricaria* occurs north of Delaware, but *heterophylla* is found as far north as Staten Island, New York. If it is to be regarded as a variety its invariable connection with *Phellos* is too significant to be ignored, but all facts and observations seem to point irresistibly to the conclusion that we must consider *heterophylla* as a hybrid, with *Phellos* as one of its parents. A. H.

Botanical Names of the U. S. Pharmacopœia. (Bull. Pharm. Reprint, pp. 20).

This is an important paper presented at the recent meeting of the American Pharmaceutical Congress. Dr. Rusby has given very close study to the names associated with drug-plants in the last edition of the "Pharmacopœia," and finds that a number of them will have to be changed in the new edition now in preparation, in order to make them intelligible to botanists and pharmacists as well. He gives a list of all the drugs, arranged alphabetically, with the proper botanical names and their dates, so far as he has had opportunity to ascertain them, together with their synonymy, and proposes to continue his investigations until they are all accurately determined—a task of no small magnitude, but for which he will have the cordial thanks of all interested.

Breves apuntes sobre la Pingüica. Sr. Murello. (El Estudio iv. 234).

Description, illustration and notes on the properties of *Arctostaphylos pungens*, locally known in Mexico by the name of "Pingüica."

Catalogue of Canadian Plants, Part VI.—Musci. John Macoun. (Geol. and Nat. Hist. Survey of Canada. Montreal, 1892. 295 pp. Octavo. price 25 cents).

Since 1861 Prof. Macoun has been collecting the material on which this catalogue is based, having had the help of Sullivant, Austin, James, and, more recently, of N. C. Kindberg, C. Muller and Warnstorf in the determinations.

It includes all the British territory north of our boundary, and Greenland, Alaska and the Pribiloff Islands. Nine hundred and fifty-three species are listed, and two hundred and thirty-seven of these are new or recently described by Kindberg and Muller, which, with fifty-three new varieties, bring the average to over twenty-five per cent. hitherto unknown. Unfortunately, fifty-eight of these are described from barren specimens, and in many cases the descriptions are so incomplete that it will be very difficult to determine just what value they will have in future study. There is no doubt that such a series of specimens as Prof. Macoun has collected and distributed in his "Canadian Mosses" will do much toward a better knowledge of that hitherto bryologically undiscovered country west of Ontario, from which most of the new species come, only forty-seven belonging to the provinces of Ontario, Quebec and Newfoundland. Twenty-five European species, new to America, are added, and two substitutions are made—*Mnium pseudolycopodioides* for *M. lycopodioides*, and *Hylocomium Pyrenaicum* for *H. Oakesii*. Of the fifty-three varieties, most of the eastern ones are of doubtful importance, as they are founded on slight characters of very common and variable species. Six genera, not hitherto reported from North America, are included—*Monogranum* with one species, *M. stenodictyon*, *Leptodontium* with one species, *L. Canadense*, which on comparison with Austin's type of *Pottia riparia* proves to be that species, which, however, is undoubtedly a *Leptodontium*, replacing *L. Canadense* by *L. riparium* (Aust.). Under *Leptobarbula berica*, also new to America, there is a mistaken citation to L. & J. Manual, p. 106. It is a synonym of *Trichostomum tenue*, Br. & Sch., not Hedw. *Zygodon* with one species is also added, *Z. viridissimus*. *Merceya latifolia* and *Lescuræa imperfecta* are both Western. Of the species retracted, *Hylocomium Flemmingii*, Austin, and *Alsia*

Macounii, Kindberg, may be noted. *Orthotrichum lonchothecium* also should be, for it is antedated by *O. stenocarpum*, Venturi.

Many changes from the distributed names of the Canadian Mosses have been made. Those who have not mounted their specimens are better off than those who have. The most serious criticisms which can be made of Prof. Kindberg's work are these: A too evident desire to name new species without sufficient comparison with American material, though some good work has been done by careful comparison with European specimens; second, unsystematic, and often meager descriptions, too frequently from sterile specimens; third, a lax system of nomenclature by which species and varieties previously described and published, or distributed, are given new names. Examples of this will be found on the species numbered 199, 245, 259, 284, 296, 749, 799, 811, 818 and 939. We hope, as our Western mosses come to be studied, that Prof. Macoun will continue the same generous policy that he has with our Eastern ones, and give students the benefit of comparison with the fine collections which he has gathered together for the "Geological and Natural History Survey of Canada." E. G. B.

Compositæ—Studies in the—I. Edward L. Greene. (Pittonia ii. 244-248).

It is pointed out that the name *Blepharipappus*, Hook. (1833), antedates *Layia*, H. & A. (1841), and the species included by Dr. Gray in *Layia* are transferred to the older genus; *Ptilonella*, Nutt., based on *Blepharipappus scaber*, Benth., is maintained as a genus. *Ereminula* is the generic name proposed for *Dimeresia*, A. Gray (1866), Prof. Greene regarding *Dimeresa*, Labill. (1824), as the same word as *Dimeresia*.

Continuity of Protoplasm through the Cell-Walls of Plants. W. J. Beal and J. W. Toumey. (Amer. Month. Micros. Journ. xiii. 129-132, illustrated).

Cultivated Native Plums and Cherries. L. H. Bailey. (Bull. 38, Cornell Univ. Agric. Exper. Sta. pp. 73, illustrated).

Professor Bailey maintains that there are two, and perhaps three, species included in the description of *P. pumila* in recent text-books. *P. pumila*, L., he regards as of northern distribution, growing on sandy and rocky shores, and characterizes it as a prostrate or decumbent shrub with linear or oblanceolate leaves. *P. cuneata*, Raf., is the name taken up for the other species, described as erect or even strict in habit, with obovate few-toothed leaves, and grows in mountainous regions in the East. The third dwarf cherry inhabits the eastern Rocky Mountains and Great Plains; it is prostrate in habit and has shorter leaves than *P. pumila,* of which the author is inclined to regard it a variety. All the other species, which are in cultivation for their fruits, are alluded to or described. *P. nigra*, Ait., separated from *P. Americana*, Marsh, by Prof. Sargent, is not regarded as distinct from that species, although Prof. Bailey appears to be somewhat uncertain of his decision in this case. N. L. B.

Descriptiones Plantarum nonnularum Horti Imperialis Botanico Petropolitani in Statu vivo examinatum. E. Regel. (Acta Hort. Petrop. xi. 299-314).

The following new species are of American derivation: *Agave Maximowicziana, Epidendrum pugioniforme, Masdevallia biflora, M. macrochila, M. Muelleri, Miltonia flavescens, Waluewa pulchella, Solanum Dammianum* and *Claviga cauliflora.*

Development of the Ovule in Grindelia squarrosa. H. W. Norris. (Am. Nat. xxvi. 704, illustrated).

Diseases of Trees likely to Follow Mechanical Injuries. W. G. Farlow. (Trans. Mass. Hort. Soc. part i. 140, 1891).

Elementary Botanical Exercises. Charles E. Bessey. (J. H. Miller, Publisher, Lincoln, Nebraska, 1892).

A series of thirteen short chapters outlining studies in the various forms of plant-life for beginners.

Erstes Verzeichniss der von E. Ule in den Jahren 1883-87 *in Brasilien gesammelten Pilze.* O. Pazschke. (Hedwigia xxxi. 93).

Two hundred and one species are listed, among which the following are described as new: *Urocystis Oxalidis, Æcidium Uleanum, Rostrupia Scleriæ, Lachnocladium Ulei, Asterina Brasiliensis, A. flexuosa, A. laxa, A. paraphysata, A. stricta, A. Uleana, A. Winterana, Meliola crenata, M. denticulata, M. tortuosa* and *M. Uleana.*

Ferns—Synoptical List of—IX. G. S. Jenman. (Bull. Bot. Depart. Jamaica, No. 32, 7, 1892).

A key to 18 species of *Adiantum*, with notes on *A. deltoideum*, *A. lucidum*, *A. Wilsoni* and *A. macrophyllum*.

Flax Culture for Fiber in the United States—A Report on. Charles Richards Dodge. (Washington, 1892; illustrated).

Geographical Distribution of Plants—The. W. F. Ganong. (Trans. Mass. Hort. Soc. part i, 140, 1891).

Labiatæ—On Certain Californian. Edward L. Greene. (Pittonia, ii, 233-236).

Audibertia polystachya, Benth. is erected into a new genus, *Ramona*, and the other Californian species placed in *Audibertia* by Bentham and A. Gray, are referred to *Salvia.*

Légumineuses de l'Ecuador et de la Nouvelle-Grenade de la collection de M. Ed. André. M. Micheli. (Jour. de Bot, vi, 117-124; 141-147; 187-193; 197-206).

An annotated list of the Leguminosæ collected by M. Andre in western equatorial South America in 1875 and 1876. *Mucuna Andreana*, *Calopogonium racemosum*, *Galactia rotundifolia* and *Cæsalpinia Andreana* are described as new.

Moss—A New Californian. N. C. Kindberg. (Pittonia ii, 243).

Description of *Camptothecium alsioides*, collected by Mr. Howe in Marin Co.

Native Orchids. Francis Wilson. (Am. Gard. xiii. 466). With illustrations of *Spiranthes simplex*, *S. gracilis* and *S. cernua.*

Notes on the Hardwood Trees of Illinois. J. Schneck. (Hardwood ii, No. i).

Pentstemons—Remarks on Certain. Edward L. Greene. Pittonia ii, 237-243).

Chelone nemorosa, Dougl. (*Pentstemon nemorosus*, Trauttv.) is maintained as a *Pentstemon* and the species of the group of *P. fruticosus* (Pursh.), = *P. Lewisii*, Benth., are discussed. *P. montanus* being a new species from the Yellowstone Park (Tweedy, n. 866) and *P. Davidsoni* a new species from California.

Phenomena and Development of Fecundation. H. J. Webber. (Am. Nat. xxvi, pp. 103-111, 287-310, plates xi-xiv).

The processes of reproduction are reviewed and compared in both animals and plants, in the latter being illustrated by drawings of *Caulerpa*, *Iris*, *Acetabularia*, *Ulothrix*, *Ectocarpus*, *Cutleria*, *Fucus*, *Dudresnaya*, *Glæosiphonia*, *Monotropa*, *Yucca*, *Lilium* and *Peronospora.*

Plant Diseases in West Virginia. C. F. Millspaugh. (Gard. and For. v. 346).

Portland Catalogue of Maine Plants—Second Edition. Merritt L. Fernald. (Proc. Portl. Soc. Nat. Hist. 1892, 41-72; reprint.

Since the issue in 1868 of the first "Portland Catalogue," compiled by Prof. Goodale and Rev. Jos. Blake, no complete account has been published of the plants recorded as occurring naturally in the State of Maine. The original Portland Catalogue is very rare, and the present one will be gladly received. During the interval since 1868 over 450 species and varieties of flowering plants and vascular cryptogams have been added, the present list enumerating over 1550. The work is a mere list, but the general distribution of most of the commoner plants is indicated by symbols. It is capitally printed, there being very few typographical errors. Acknowledgment is specifically made for aid received from several collectors and some seventy others are stated to have furnished material. An interesting omission which we note is *Littorella lacustris*, sent us in 1891 by Prof. F. L. Harvey, from Orono. *Lechea intermedia*, Leggett, is pretty certainly common in the State, while *L. minor*, at least the plant described under that name in Gray's Manual, is not known to occur there. For nomenclature the author has naturally followed the sixth edition of that manual. N. L. B.

Primitiæ Floræ Costaricensis. (Bull. Soc. Bot. Belg. xxx, 196-305).

This comprises—I. Piperaceæ, by M. C. DeCandolle, who describes twenty-four species of *Piper*, and ten of *Peperomia* as new, besides numerous varieties. II. Labiateæ, by M. J. Briquet, giving descriptions of new species of *Salvia* and *Stachys*. III. Melastomaceæ, by M. A. Cogniaux, in which new species of *Tibouchina*, *Monochætum*, *Axinæa*, *Leandra*, *Conostegia*, *Miconia*, *Clidemia*, *Bellucia*, *Ossæa*, *Blakea* and *Topobea* are characterized. IV. Cucurbitaceæ, by M. Cogniaux, with descriptions of novelties in the genera *Pittiera* (new genus), *Cyclanthera*, *Elaterium* and *Sicyos*. V. Araliaceæ, by M. E. Marchal, with *Didymopanax Pittieri*, n. s.p. VI. Leguminosæ, by M. M. Micheli, with new species in *Cracca*, *Mucuna* and *Mimosa*. VII. Polygalaceæ, by M. R. Chodat, with new species in *Polygala* and *Monnina*.

Sarracenia flava. (Meehan's Monthly, ii, 113; illustrated.)

Second Edition of Webber's Appendix to the Catalogue of the Flora of Nebraska, with a Supplementary List of Recently Reported Species. Charles E. Bessey. (Contrib. Bot. Dept. Univ. Neb. N. S. iii, p. 55).

This consists of Mr. Webber's paper, printed in Part I. of the 6th volume of the Transactions of the St. Louis Academy, to which Dr. Bessey now adds 170 species and varieties, 77 of them Phanerogamia, together with some revisions of former determinations. One of the most interesting plants recorded is *Clematis Douglassi*, var. *Scottii* (Porter), found by Prof. Swezey in Sheridan County, which we take to be a perfectly valid species, being strengthened in this view by the similar attitude of O. Kuntze (Verhand. Bot. Verein, Brandenburg, xxvi, 179), who would doubtless have made it a variety, sub-species, sub-variety, or sub-sub-variety, if there had been any chance of so doing.

N. L. B.

Silva of North America, Volume IV—Rosaceæ—Saxifragaceæ. C. S. Sargent. (4to, pp. 141, plates cxlviii-cxcvii).

This volume contains figures and descriptions of the following species: *Chrysobalanus Icaco, Prunus nigra, P. Americana, P. hortulana, P. angustifolia, P. Alleghaniensis, P. subcordata, P. umbellata, P. Pennsylvanica, P. emarginata, P. Virginiana, P. serotina, P. Caroliniana, P. sphærocarpa, P. ilicifolia, Vauquelinia Californica, Cercocarpus ledifolius, C. parvifolius, Pyrus coronaria, P. angustifolia, P. rivularis, P. Americana, P. sambucifolia, Cratægus Douglasii, C. brachyacantha, C. Crus Galli, C. coccinea, C. mollis, C. tomentosa, C. punctata, C. spathulata, C. cordata, C. viridus, C. apiifolia, C. flava, C. uniflora, C. æstivalis, Heteromeles arbutifolia, Amelanchier Canadensis, A. alnifolia* and *Lyonothamnus floribundus*, besides several regarded as varieties by the author. The volume maintains the superior character in text and illustrations of its predecessors. Hardly a slip in typography or anything else in the make-up of the work is discernible. We note one error on page 132, where *Amelanchier alnifolia* is said to range "from the valley of the Yukon, southward through the ranges of *Northeastern* America, etc." while *Northwestern* America must be intended, there being no evidence, we believe, of the occurrence of this species east of Michigan and Ohio. N. L. B.

Sinonimia Vulgar y Cientifica de Varias de las "Plantas de la Nueva España," de M. Sessé y José Mociño. José Ramérez. (El. Estudio iv. 220).

Tsuga Pattoniana. (Gard. Chron. xii. 10). With illustrations of *Tsuga Pattoniana* and *T. Mertensiana.*

Umbellularia. (Gar. and For. v. 349). With illustration of *Umbellularia Californica.*

Proceedings of the Botanical Club of the Forty-first Meeting of the A. A. A. S., Rochester, N. Y., August 18-24, 1892.

THURSDAY, AUGUST 18TH.

The meetings of the Club were held in the main building of Rochester University, in which were carried on the sessions of the American Association.

Owing to the unavoidable absence of both President and Vice-President, the opening session of the Club at 9 A.M. was called to order by its Secretary.

Dr. H. H. Rusby was chosen to fill the vacancy of the President's chair, and Dr. W. P. Wilson that of Vice-President.

To save time, the reading of the minutes was dispensed with. The Treasurer's report was accepted, and a voluntary contribution amounting to $4.56 was taken up to defray the expenses of the Secretary's office. The Committee on Nominations to nominate officers for the ensuing year was appointed by the Chair, and consisted of the following members: Arthur Hollick, C. R. Barnes and F. V. Coville. The Local Committee reported upon the proposed excursion of the Club to the lake shore, and the matter was referred by the Club to the President and Secretary.

Under the head of new business, Dr. N. L. Britton presented the following resolution, the outcome of a preliminary meeting of those especially interested in questions of nomenclature, held the night previous:

In view of the great desirability of establishing a stable system of botanical nomenclature in North America, I move the appointment of a committee of seven members of the Club, of which the President shall be one, to consider the questions involved, and to submit a set of recommendations to the Club before the close of the present session.

The resolution was adopted and the President appointed the following members to serve on this committee: H. H. Rusby, N. L. Britton, J. M. Coulter, F. V. Coville, L. M. Underwood, L. F. Ward and W. A. Kellerman.

The first paper on the programme, by Dr. Britton, "Some Nomenclatorial Problems," was, upon the request of the author, omitted, in view of the previous conference and appointment of a committee to consider the matter.

The papers presented, together with brief abstracts, are given in sequence of delivery as follows except in cases noted, where they are to be published subsequently in full. So far as possible, the discussion following each paper has been added to the abstract.

1. "The use of the terms Range, Locality, Station and Habitat," by F. V. Coville.

Mr. Coville suggested the following definitions:

Range.—The region over which a type naturally grows.

Locality.—The more or less general geographic position of one or more individuals of a type.

Station.—The precise spot upon which a type occurs or an individual was collected.

Habitat.—The kind of place in which a type or individual occurs.

This paper was discussed by Dr. Britton, who pointed out the need of more such papers to restrict definitely the meanings of terms in common use among botanists; Dr. Barnes, who objected to the third clause on the ground that it was impossible to define the precise spot upon which a type occurs; Mr. Seaman, who protested against the use of the word *type*, and suggested the substitution of the word species; Mr. Fernow, who agreed with Mr. Seaman in objection to the word type, and suggested under the definition of the term station the phrase "precise spot upon which the individual occurs," for "precise spot upon which the individual was collected."

On motion of Dr. Britton, a committee consisting of Messrs. Coville, Beal and Fernow was appointed to discuss the matters brought up by the paper, and report before the close of the session.

2. "Travels in Paraguay and its Flora," by Thomas Morong.

The speaker gave a brief account of his two years' experience in Paraguay, stating that a complete account of the botanical results of his trip would soon be published.

Dr. Rusby called the attention of the Club to the dangers that had surrounded Dr. Morong in his travels.

3. "A variety of *Polypodium vulgare*, L., new to America," by L. M. Underwood.

In the autumn of 1890 my attention was called to a peculiar "crispy" fern, growing on Mohawk Mountain, Connecticut, by Mrs. T. R. Waite, of New Haven, who had spent several summers on the summit of the mountain in the log cabin established there for tourists. The plant proved to be a variety of *Polypodium vulgare* hitherto unknown in this country, but described from England as var. *Cambricum*. The plant is easily recognized by its deeply pinnatifid pinnæ, which are strongly in contrast with the normal entire pinnæ of typical forms of the species. This discovery is rendered more interesting by the announcement of the "State Botanist" of New York* of a second European variety of this same species. Unlike var. *cristatum*, as figured by Peck and shown in the specimens kindly communicated by him, the specimens of var. *Cambricum*, as found on Mohawk Mountain in August, 1890, and again in July, 1891, were entirely sterile, not even showing rudimentary sori. The plants were growing on the sloping face of the granitic rock of which the mountain is composed, in small patches thoroughly entangled with plants of normal *Polypodium vulgare*. Environment is, therefore, not the cause of the variation in this instance, but it must be attributed rather to an inherent tendency to be something different. It is a question of interest to know just when to recognize a form of this kind as a true botanical variety.

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* XLIV Reg. Report, plate I.

In addition to the paper printed in full above, the author showed specimens of *Onoclea sensibilis*, var. *obtusilobata*, illustrating a peculiar adaptation in the fertile fronds that succeed, in time of appearance, sterile fronds that have been cut or injured. These fertile fronds show a development of foliar surface abnormal to fronds of uninjured plants, and open out upon first arising from the root-stock, evidently to supply chlorophyll bearing tissue to perform the necessary work of assimilation. The paper was discussed by M. B. Waite, who inquired if the peculiar variety of *Polypodium vulgare* might not be a hybrid. The author thought not, as he had found all gradations of variation from the typical *P. vulgare.*

The afternoon session was opened by the report of the Committee on an Excursion to the shore of Lake Ontario. The committee decided it impracticable to accept the invitation of the local committee.

The following papers were presented:

4. "Symbiotic Growths in the Roots of Ranunculaceæ," by F. B. Maxwell (presented by W. R. Dudley).

This was a preliminary paper on the occurrence of fungal hyphæ in the cortex of the roots of dry land species of *Ranunculus*, *Anemone*, *Clematis* and other genera.

Discussion was opened by Dr. Beal, who inquired if the mycelium of the fungus was found at or near the tip of the growing roots of the plants; to which the author replied that these fungal hyphæ were found within one to two centimetres of the root-tip. Prof. Kellerman asked if any exterior signs of the presence of fungus could be seen; to which Maxwell replied that to all external appearances the roots were perfectly healthy and normal in all respects. Prof. Dudley mentioned the fact that work upon the fungus had been secondary to a study of the anatomy of the roots, and had been suggested by the presence of similar fungous bodies in the roots of Orchidaceæ, and expressed the opinion that these fungi, growing in symbiotic relations with the roots of plants, might be much more frequent than had been supposed. Dr. Rusby inquired if all plants of a species were attacked alike, to which the author replied in the negative. Dr. Britton brought out the fact that all, or nearly all, roots of a single plant were likely to contain the fungus; Dr. Beal, that no difference between plants with these fungi and those without was observable above ground.

5. "Some Rare and Interesting Fungi from Florida," by W. T. Swingle.

In this note the author called attention to, and showed specimens of, four little-known fungi from Florida. The first an Ascomycete, new to America, and also on a new host, resembles, in a slight degree, *Claviceps*, but differs from this fungus in many respects. The parasite attacks the inflorescence of *Cenchrus echinatus* while it is young, and transforms it into a black, shining sclerotium from two to three inches long. These sclerotia produce the first year spermagonia as pustular bodies partially imbedded in the substance of the sclerotium, and later, after one year at least, the ascigerous form, which consists of a globular head supported on a long, slender stipe. The asci are embedded in cavities in this head. The fungus has been named by Fries, *Ephelis*, from the sclerotial and spermagonial stage, and by Speggazzini as *Balansia*, from the ascigerous form. It has also been described by Cooke & Massee in Annals of Botany. Unlike ordinary *Claviceps*, the tissue of the host plant is included within the substance of the sclerotium. He noted, on authority of Prof. Rolfs, that the veterinarian of the Florida Experiment Station is at work upon the question whether these sclerotia produce a disease similar to ergotism, and thought that its destructive action upon the terrible sand-burr would be worth looking into.

The second fungus was a species, probably new, of *Cæoma*, attacking the cones of *Pinus palustris* and *P. Cubensis*. When attacked, the cones become broader and stouter than the healthy ones, and assume a chocolate-brown exterior. The exterior layer upon breaking away, as it sometimes does in a single night, reveals the immense sorus of chrome-yellow spores, which renders the cone conspicuous for at least one-eighth of a mile.

The third interesting species, found upon the leaves of the sour orange in the hummock land of Florida, appears as a whitish or gray strand, which ascends the young branch, and on reaching the leaf spreads itself out on the upper surface in a thin, whitish layer, and causes a wilting and final death of the leaf. From the habit of spore production, the author thinks it may be related to the *Thelephoriaceæ.*

The author finally exhibited a disease of pear trees and fruit, which resembled that of the orange previously spoken of, which was called to his attention by Prof. Rolfs. It differs from the orange disease in its mode of spore formation, and in the color of the strands which are found on the twigs and fruit. Discussed by Kellerman, who inquired as to the time of fruiting of the ascigerous form of the fungus on *Cenchrus*, bringing out the fact that this form was mature only after the first year, as in *Claviceps.*

6. "Anatomy as a Special Department of Botany," by Dr. Emily L. Gregory.*

FRIDAY, AUGUST 19TH.

The morning meeting was called to order, and the following paper read:

7. "Observations upon Certain Species of Asclepiadaceæ as Insect Traps," by Thomas Morong.

The paper was discussed by Dr. Beal, who stated that he had found large numbers of mosquitoes caught by the flowers of *Apocynum androsæmifolium;* and by Mr. Fairchild, who called attention to the fact that the two pollen masses of the pollinia of several of our common asclepiads which, when first withdrawn from their cavities beside the stigmatic surface of the flower, are lying in one plane with edges to each other, when drying, close like the leaves of a book; he suggested this might be an adaptation to aid in bringing about its insertion into the slit of the stigmatic cavity of another flower.

Dr. Morong exhibited at this time a species of *Nymphæa*, reference to which he had previously made in the "Botanical Gazette." The species he had named *Nuphar rubrodiscum* and believed it to be a fertile hybrid of *N. Kalmianum* and *N. advena.* He referred to the publication of the species as a variety of *N. advena* in the last edition of Gray's Manual, but maintained that it is a distinct species, but if considered a variety, he suggests it is most nearly related to *N. Kalmianum.*

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* To be published subsequently.

Dr. Beal offered the following resolution at this point: Resolved, that a vote of thanks of the Botanical Club be extended to E. B. Southwick, Botanist of the Central Park, New York, for his very interesting exhibit of some sixty or more species of fruits and nuts including their branches and leaves. The resolution was unanimously accepted.

The President, out of courtesy to the valuable work done by the United States Department of Agriculture, called upon Dr. Vasey to make some remarks upon the work now in progress in the Botanical Division of this Department. The Doctor outlined briefly the various undertakings of the year, mentioning first, the field work, which during the present season, has been confined to Idaho, owing to insufficient means for the support of field agents in other States as heretofore maintained. The large number of 53,000 specimens has been collected the present season and more are being sent in. In addition he mentioned the publications of the Division and announced the speedy completion of the Grasses of the Pacific Slope, a work supplementary to the Grasses of the Southwest; also the admirable work of Dr. Coulter upon the Flora of Texas, of which the third part was soon to appear. As to the experimental work in the cultivation of the forage grasses carried on at Garden City, Kansas, with branch stations in Colorado, Utah, North and South Dakota, Wyoming, Texas and New Mexico, all of which branch stations, however, have been discontinued for lack of funds; the speaker mentioned *Bromus inermis* as one of the most promising grasses, for pasture uses, of which twenty-five acres were already planted near Garden City. Dr. Vasey mentioned *Panicum virgatum*, *Andropogon nutans* and *Agropyrum glaucum* as likely to prove of value, either as pasture grasses or for meadow, and spoke hopefully of work in progress upon the growth of cereals in this arid region, expressing his opinion that cereals would be finally grown in this section of the country without irrigation.

On suggestion of Dr. Britton, who made a preliminary report of the Committee on Nomenclature, the matter of the reception of the report was made a special order for the afternoon meeting. No one objecting, the chair announced that the report of the Committee on Nomenclature would be discussed during the afternoon session.

Dr. Arthur spoke of the committee of botanists that had been appointed by the World's Fair Auxiliary to consider the matter of a Botanical Congress at the World's Columbian Exposition in 1893, stating that this committee had arranged for and caused to be printed, circular letters to be sent to all American botanists, asking their opinions in regard to the feasibility of holding such a Congress. These letters had not been distributed, for some unknown reason. In regard to the probability of the attendance of English and German botanists, if such a congress should be held, Dr. Arthur stated that from personal interviews he had ascertained that while a few German Botanists would probably attend, none, or at least very few of the English botanists would be able to come. Prof. Barnes asked for the opinion of the committee, and the Club was informed by Dr. Arthur, a member of this committee, that it was their opinion that the holding of such a Congress would not be feasible.

On motion of Prof. Barnes it was resolved:

That it is the sense of the Botanical Club of the American Association for the Advancement of Science that it is inexpedient to attempt to hold an International Congress of Botanists in connection with the World's Columbian Exposition in Chicago, in the summer of 1893.

Prof. Arthur stated that inasmuch as foreign botanists have been given the impression that there will be an International Botanical Congress at Chicago, he considered it very desirable that a special effort be made to make the next meeting of the Club and Botanical Section as interesting, important and attractive as possible, and offered the following resolution, which was unanimously adopted:

That a committee of three be appointed to act in connection with the officers of the Section of Botany, to arrange for the gathering of botanists next year, the committee to report at a later meeting.

The President appointed Prof. Arthur, Dr. Robinson and Prof. MacBride.

8. "General notes on the Cryptogamic Flora of Liberia," by O. F. Cook, was in the nature of a talk, of which the following are a few of the important points mentioned. Liberia is a tropical forest, and really no dry season occurs, for the

moisture is so great that even when the rainy season has passed the air is saturated with water. Travelling through this dense forest is made difficult by the many fallen trees which are usually covered with vines and twining plants. There are no Coniferæ to be found in the region. and only four or five species of palms, while orchids are abundant, their flowers are small and inconspicuous.

Aquatics are not numerous in the waters, and the ferns are largely epiphytic. One species is especially noticeable as apparently possessing a large prothallium in the shape of a dish which is used by the plant for the purpose of collecting water, earth, and other substances for the nutrition of the plant.

Only one species of *Adiantum* was observed, and the Hymenophyllaceous forms are few. A species resembling a *Gleichenia*, forms delicate pea green banks, very beautiful in color, while a climbing *Selaginella*, found growing upon bushes and small trees, and another upon rocks, are more beautiful than the cultivated species of that genus. One species of *Lycopodium* grows in the region to a height of 8 to 10 feet, and resembles superficially a tamarack tree.

The true mosses are scarce, with the exception of *Barbula* forms, which are frequent, and one hypnoid form found hanging from the trees, but never in fruit. Hepaticæ are present in this moist region in enormous numbers, and almost every tree-trunk is covered with a species probably of the genus *Plagiochila*. The fresh-water algæ are not numerous, a few forms like *Batrachospermum* only being found among the lower cryptogams. The Hymenomycetes are very numerous and bright-colored; one species of *Amanita* is very much larger than any ever seen before by the speaker, attaining the size of 10 inches in height by 10 inches in diameter. The Polyporei seem to be more abundant than the Agaracini, and the author is of the opinion that the present systematic arrangement of the Hymenomycetes would be of little use in this region because of the strange forms. The Gastromycetes are present only in few numbers, and parasitic fungi are extremely scarce, only one true disease, that upon the coffee plant, being noticed, and this only occasioning insignificant injury.

Lichens and Myxomycetes are not numerous, although a few strange forms were found, notable among which was a pendant species of *Comatricha*, two and one-half inches long. The species of Myxomycetes are peculiar as being represented by forms nearly related to those common in North America.

The afternoon meeting was called to order by the President pro tem, and the Committee on Botanical Nomenclature was called upon to report. Dr. Britton, chairman of the Committee, stated upon presentation of the report that it was the result of the deliberations of as large a body of botanists as could be gathered together in a preliminary meeting Tuesday evening, together with the deliberations of the committee appointed by the club, and further, that the committee was unanimously agreed upon the report. On motion, the report was adopted article by article, with slight amendments, and unanimously as a whole, as follows:

Resolved: That the Paris code of 1867 be adopted except where it conflicts with the following:

I. THE LAW OF PRIORITY.—Priority of publication is to be regarded as the fundamental principle of botanical nomenclature.

II. BEGINNING OF BOTANICAL NOMENCLATURE.—The Botanical nomenclature of both genera and species is to begin with the publication of the first edition of Linnæus "Species Plantarum," in 1753.

III. STABILITY OF SPECIFIC NAMES.—In the transfer of a species to a genus other than the one under which it was first published the original specific name is to be retained, unless it is identical with the generic name, or with a specific name previously used in that genus.

IV. HOMONYMS.—The publication of a generic name or a binomial invalidates the use of the same name for any subsequently published genus or species respectively.

V. PUBLICATION OF GENERA.*—Publication of a genus consists (1) in the distribution of a printed description of the genus named; (2) in the publication of the name of the genus and the citation of one or more previously published species as examples or types of the genus, with or without a diagnosis.

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*Amended August 22nd by the insertion of the word "only" after the word "consists" in the second line.

VI. PUBLICATION OF SPECIES.*—Publication of a species consists (1) in the distribution of a printed description of the species named; (2) in the publishing of a binomial, with reference to a previously published species as a type.

VII. SIMILAR GENERIC NAMES.—Similar generic names are not to be rejected on account of slight differences, except in the spelling of the same word; for example *Apios* and *Apium* are to be retained, but of *Epidendrum* and *Epidendron*, *Asterocarpus* and *Astrocarpus*, the later is to be rejected.

VIII. CITATION OF AUTHORITIES.—In the case of a species which has been transferred from one genus to another, the original author must always be cited in parenthesis, followed by the author of the new binomial.

N. L. BRITTON,	FREDERICK V. COVILLE,
JOHN M. COULTER,	LUCIEN M. UNDERWOOD,
HENRY H. RUSBY,	LESTER F. WARD,
WILLIAM A. KELLERMAN,	*Committee.*

The principle features of the discussion were as follows:

ART. I was adopted without important discussion, the vote standing 14 to 4 in its favor.

ART. II unanimously adopted by acclamation.

ART. III adopted by acclamation, which was not unanimous. Mr. Fernow inquired in regard to the last clause, if duplicate binomials were in use among European botanists. Dr. Britton replied with the statement that to his knowledge they were not. Mr. Fernow inquired as to what specific name would be retained in case the oldest was a duplicate. Mr. Coville replied the next oldest.

ART. VI adopted unanimously.

ART. V adopted unanimously after considerable discussion. Mr. Swingle raised the question that publication of a genus without a diagnosis could not properly constitute its publication, to which Mr. Coville answered that in the "Species Plantarum," taken as the beginning of botanical nomenclature, all genera were without diagnosis, and Dr. Britton suggested that the probability of future publication of genera without diagnoses was not great.

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* Amended, August 22d by the insertion of the word "only" after the word "consists" in the second line.

The article was further discussed by Messrs. Vasey, Fernow, Mohr, Bailey and Coulter, but as much of this referred to article I and not to V it is not repeated here.

ART. VI adopted unanimously after a protracted discussion, in which distinct differences of opinion were expressed. Mr. W. T. Swingle objected to the exclusion of specimens distributed in exsiccati or collections from consideration as published species, even if without dignoses, and offered the amendment as a 3d section to be added to this article: "(3) in the distribution of specimens with ink or printed labels to the principal herbaria or specialists." The amendment was lost, the vote standing 12 to 4 against its adoption. Mr. O. F. Cook also offered the following amendment: "that all species described before Jan. 1st, 1893, under herbarium and manuscript names shall stand, but not after that date." This amendment was lost.

ART. VII adopted unanimously.

ART. VIII adopted unanimously.

Dr. Britton presented the following resolutions, which were unanimously adopted:

Resolved: That the Committee on Nomenclature be continued as a permanent Committee of the Club or Botanical Section of the A. A. A. S. to prepare and print a list of flowering plants within the area of the 6th edition of Gray's Manual, in accordance with these recommendations.

(Amended Aug. 22d, increasing the area by including the States of Kansas and Nebraska, and the Canadian Provinces from Manitoba to Newfoundland.)

Resolved: That this Committee be empowered to receive all suggestions and criticisms of this list, and to report upon the matter at the next meeting of the Club or Botanical Section.

MONDAY, AUGUST 22D.

The meeting was called to order by the Secretary, who called Mr. H. L. Russell to the chair, in the absence of President and Vice-President.

The Committee on Nominations reported, naming the following members as officers for the ensuing year: President, W. P. Wilson;

Vice-President, W. A. Kellerman; Secretary, T. H. MacBride. They were unanimously elected.

The following papers were presented:

9. "On the proposed Hand-book of Mosses of Eastern America," by Mrs. E. G. Britton. Discussed by Messrs. Barnes, Jones and Claypole.

10. "Weeds and Weed Roots," by B. D. Halsted. A simple method of photographing herbarium specimens from above, consisting of a framework to support the camera at a distance of 15 to 25 feet above the specimens laid out upon a large table. With illustrative photographs.

11. "The re-discovery of *Juncus Cooperi*," by F. V. Coville.*

12. "The North American *Amelanchiers*," by N. L. Britton.*

13. "A new form of Root Cage," by J. C. Arthur. The author exhibited a new form of root cage for use in the study of the growth of roots, consisting of two plates of glass separated by thin strips of the same material and held in place by zinc clamps, the whole to be placed in a shallow trough, filled with water. The advantages of the cage with easily removable glass sides was dwelt upon.

14. "The Botanical Garden movement in New York," by N. L. Britton.

15. "A few additions to the Hepatic flora of the Manual Region,"* by L. M. Underwood.

Discussed by Mr. Coville, who mentioned the finding of a *Fossombronia* in the neighborhood of Cayuga Lake, which he believed was referable to *F. cristata*.

The following resolutions were presented and adopted:

"That Dr. Lucien M. Underwood be delegated to represent this Association of American Botanists at the International Botanical Congress to be held at Genoa, Italy, Sept. 4 to 11, 1892."

"That a committe, of three be appointed to obtain funds by subscription to defray the expenses of the delegate."

The Chairman appointed Dr. J. M. Coulter, Dr. W. P. Wilson and Dr. E. F. Smith.

The afternoon meeting was called to order by the Vice-President pro tem., and the Committee on Arrangements for the meeting of botanists in connection with the Association next year, appointed Friday morning, reported the following recommendations, which were adopted :

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*To be printed in full later.

I. (1). That the officers (vice-president and secretary) of the section of botany for 1893 shall, together with one person to be chosen by the Botanical Club, constitute a committee to whom is referred the arrangement of a special programme for the meeting of 1893.

(2). That the programme shall include, among other matters, certain special topics selected by the committee.

(3). That each topic shall be introduced by a paper presented by some person to whom the topic has, with his consent, been assigned.

(4). That upon completion of the preliminary programme and other arrangements, a printed statement, with an invitation to be present at the meeting, be sent to both American and foreign botanists.

II. That a committee of three, of which Dr. N. L. Britton shall be chairman, be appointed to make such arrangements for special excursions at the close of the meeting, as may be found practicable and desirable.

In accordance with the recommendations of the report, the President appointed the following committees:

1. The Committee of Arrangements.—Dr. Bessey, Mr. Coville and Prof. Barnes.

2. The Committee on Excursions.—Dr. Britton, Dr. Trelease and Dr. Campbell.

The matter of the organization of a permanent American Botanical Society was brought up by Professor Bailey, and the following resolution offered and adopted :

"That a committee of nine members be appointed by the Chairman to consider the formation of an American Botanical Society after obtaining the views of the botanists of America on the proposition, and report thereon at the next meeting of the Club."

The Chairman appointed as this committee : L. H. Bailey, Chairman, W. G. Farlow, Emily L. Gregory, B. D. Halsted, James Fletcher, Douglass H. Campbell, C. R. Barnes, F. Lamson-Scribner, Lester F. Ward. On motion of Dr. Britton, Dr. W. P. Wilson's name was added.

The following papers were read:

16. "On the Genus *Campylopus* in North America," by Mrs. E. G. Britton.*

17. "Note on a Recent Outbreak of Peach Yellows near Ann Arbor, Mich.," by A. A. Crozier. The speaker adduced evidence to prove the communicability of the disease.

18. "Some observations on *Epigæa repens*, by W. P. Wilson.*

19. "Notes on Some Species of *Cratægus*," by N. L. Britton.*

Dr. Arthur exhibited leaves of *Drosera rotundifolia*, brought by Miss Edna Porter, of Buffalo, from which young plants were growing.

TUESDAY, AUGUST, 23D.

The meeting was called to order by the Vice-President pro tem. at 1:30 P.M., and after the appointment of the Committees on Arrangements for the ensuing year, on excursions for the next meeting and on the establishment of an American Botanical Society, (the names appearing in their proper places below the resolutions as adopted), the club listened to the following papers:

"Observations on the ripening of the seeds of *Cuphea*," by Mrs. H. L. T. Wolcott.

The paper called attention to a novel adaptation in a cultivated species of *Cuphea*, by which the placenta with immature ovules pushes through the side of the calyx tube and stands exposed as a curved projection for the purpose of ripening its seeds, which fall to the ground on maturity. The author also wished to make a report upon her work, in connection with the Department of Agriculture, which she had been requested to make by Dr. J. N. Rose, and which consisted of tests of large numbers of seeds of rare plants from Mexico and other regions. Although the work has just been begun, there have been secured a large number of rare *Ipomœæ*, now growing in pots.

The paper was discussed by Dr. Britton, who stated that *Cuphea viscosissima* had a habit similar to that called attention to, by Mrs. Wolcott.

20. "Notes on the Moutain Flora of Northern Alabama," by Chas. Mohr.†

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* To be published later.

† To be printed in full in an early number of "Garden and Forest."

Mr. Fernow, as chairman of the committee on a discussion of what data should accompany herbarium specimens, reported a complete disagreement of opinion in the committee, and on motion this committee, consisting of Messrs. Fernow, Coville and Beal, was continued to report at the next meeting. Owing to the desire of many members to take advantage of the excursion to the fish hatchery at Mumford, the club adjourned at 2 P.M. to meet in 1893 at Madison, Wisconsin. The following papers were read by title only, either because of absence of their authors or for lack of time.

"Some general questions in the classification of Myxomycetes," by O. F. Cook.

"North American Cacti," by J. M. Coulter.

"Cultivated species of *Brassica*." by L. H. Bailey.

"Notes on the distribution of plants in Florida," by P. H. Rolfs.

"Notes on some fungi common during the season of 1892 at Ames, Iowa," by L. H. Pammel.

"Notes on some Kansas weeds," by A. S. Hitchcock.

"Notes on the flora of Block Island," by W. W. Bailey.

"Notes on the distribution of a few plants," by L. H. Pammel.

"Phænological notes for 1892," by L. H. Pammel.

"Observations on the North American species of Orchidaceæ and their nomenclature," by Thomas Morong.

"Some noteworthy features of the flora of West Virginia," by C. F. Millspaugh.

"On the genus *Ditrichum* in North America with one new Western species and corrections for two Eastern species," by Mrs. E. G. Britton.

"Notes on terminology," by Theo. Holm.

"Notes upon a revision of the North American Naiadaceæ," by Thomas Morong.

"Notes on some pear and apple diseases," by M. B. Waite.

"Modifications of the tomato plant resulting from seed selection," by E. S. Goff.

"Some of the rare Mosses of White Top and vicinity, recently collected on a trip to Southwestern Virginia," by Mrs. E. G. Britton.

"Galvanotropism," by J. C. Arthur.

"A botanical terminology," by A. A. Crozier.

"A proposed collection of mosses of New York State for the Columbian Exposition," by Mrs. E. G. Britton.

"Climing habit of *Tillandsia usneoides*," by W. P. Wilson.

D. G. FAIRCHILD, *Secretary.*

TITLES OF BOTANICAL PAPERS READ OR PRESENTED BY TITLE BEFORE THE SECTION OF BIOLOGY, A. A. A. S., ROCHESTER MEETING, AUGUST, 1892.

Notes on *Ranunculus repens* and its Eastern North American allies, by N. L. Britton.

Notes on a monograph of the North American species of *Lespedeza*, by N. L. Britton.

The root system of *Mikania scandens*, by W. W. Rowlee.

Preliminary comparison of the Hepatic Flora of boreal and sub-boreal regions, by L. M. Underwood.

Notes on Maize, by G. Macloskie.

Spikes of Wheat bearing abnormal spikelets, by W. J. Beal.

A study of the relative lengths of the sheaths and internodes of grasses for the purpose of determining to what extent this is a reliable specific character, by W. J. Beal.

Adaptation of seeds to facilitate germination, by W. W. Rowlee.

Bacteriological investigations of marine waters and the sea floor, by H. L. Russell.

Sketch of the Flora of Death Valley, California, by F. V. Coville.

How the application of hot water to seed increases the yield, by J. C. Arthur.

Heredity of acquired characters, by M. Miles.

On the supposed correlation of quality in fruits—a study in evolution, by L. H. Bailey.

Non-parasitic Bacteria in Vegtable Tissue, by H. L. Russell.

Notes on Yellow Pitch-pine—*Pinus rigida*, Mill. var. *lutea*, Kell. n. v., by W. A. Kellerman.

Germination at Intervals of Seeds Treated with Fungicides, by W. A. Kellerman.

The Fertilization of Pear Flowers, by M. B. Waite.

The Fertilization of the Fig and Caprification, by C. V. Riley.

A Comparative Study of the Roots of Ranunculaceæ, by F. B. Maxwell (presented by W. R. Dudley.)

The conditions which determine the distribution of bacteria in the water of rivers, by J. H. Stoller.

Notes on *Daucus Carota*, by C. W. Hargitt.

Geographic relationship of the flora of the high Sierra-Nevada, California, by F. V. Coville.

Variation in native ferns, by W. M. Beauchamp.

Life-for-ever eradicated by a fungous disease, by D. G. Fairchild.

Otto Kuntze's changes in nomenclature of North American grasses, by G. Vasey.

Revised nomenclature of the arborescent flora of the United States, by B. E. Fernow and G. B. Sudworth.

Characteristics and adaptations of desert vegetation, by F. V. Coville.

Shrinkage of woods as observed under the microscope, by F. Roth.

Peziza sclerotium, by L. H. Pammel.

Temperature and some of its relations to plant life, by L. H. Pammel.

Pleospora of *Tropæolum majus*, by B. D. Halsted.

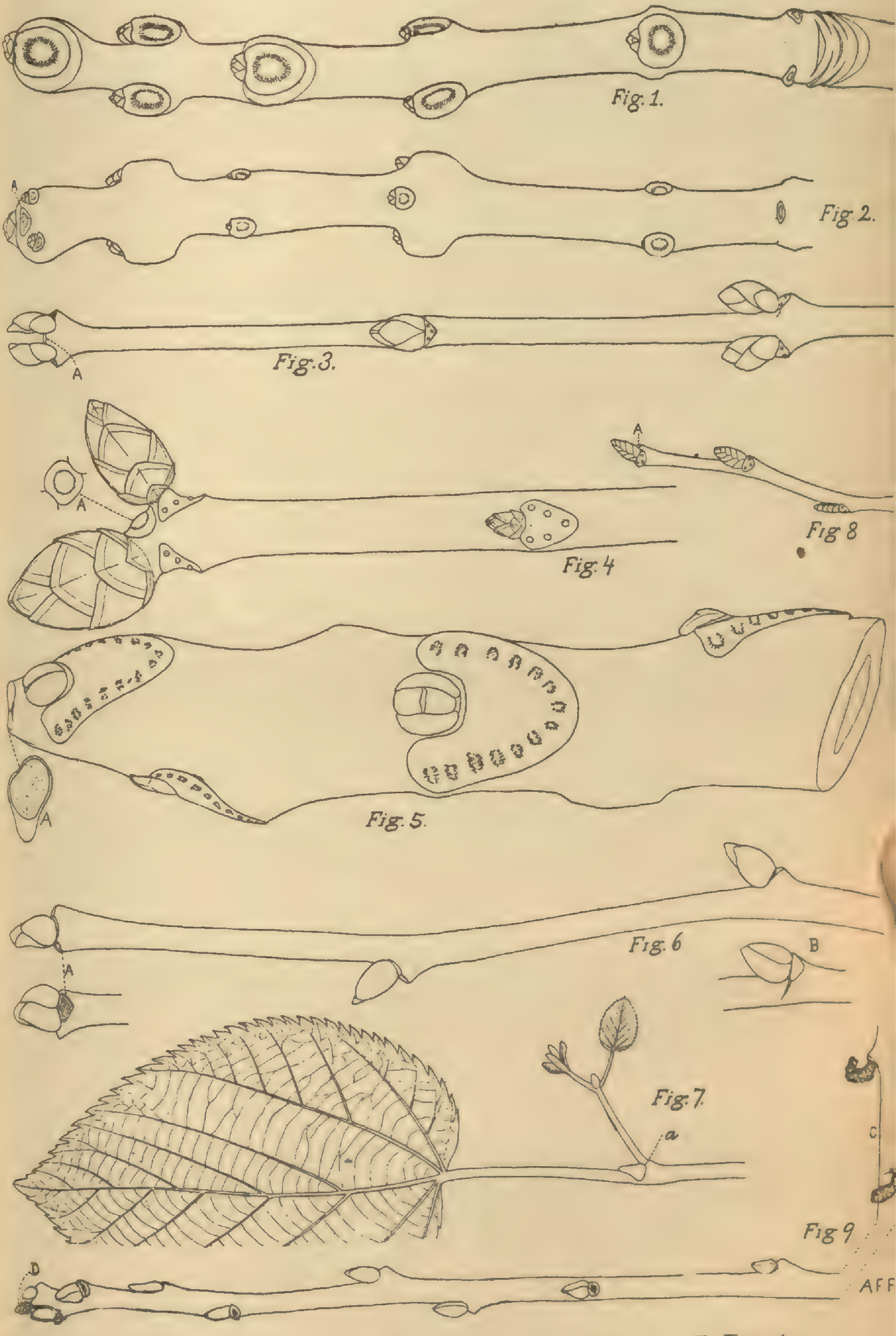
Secondary spores of *Anthracnoses*, by B. D. Halsted.

A Bacterium of *Phaseolus*, by B. D. Halsted.

The significance of Cleiostogamy, by T. Meehan.

During the meeting it was decided to divide the Section of Biology into two sections, one of Zoology and one of Botany.

The next meeting of the Association will be held at Madison, Wis., and the officers elected for the Section of Botany are, Vice-President: C. E. Bessey, University of Nebraska; Secretary: F. V. Coville, Dept. of Agriculture, Washington, D. C.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On the Casting Off of Twigs of certain Trees. A. F. Foerste.

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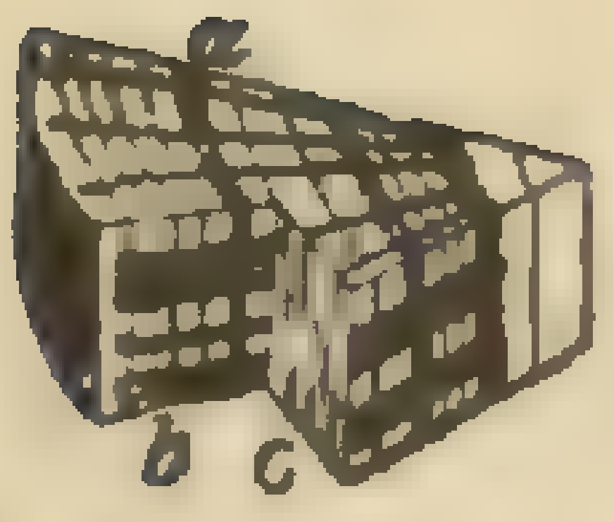

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(*2*) THE MEMOIRS.

The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly and an invariable price will be fixed for each.

Volume I. contains the following papers:

No. 1.—Studies of the Types of various Species of the Genus *Carex*, by Professor L. H. Bailey. This cannot now be had separately.

No. 2.—A List of the Marine Algæ hitherto observed on the Coasts of New Jersey and Staten Island, by Isaac C. Martindale. Price, 50 cents.

No. 3.—An Enumeration of the Hepaticæ collected by Dr. H. H. Rusby in South America, with descriptions of many new species, by Dr. Richard Spruce. Price 75 cents.

No. 4.—On Seedless Fruits, by Dr. E. Lewis Sturtevant. Price, 50 cents.

Volume II contains the following papers:

No. 1.—On Reserve Food Materials in Buds and Surrounding Parts, with two plates, by Professor Byron D. Halsted. Price, 50 cents.

No. 2.—Contributions to the Botany of Virginia, with two plates, by Anna Murray Vail and Arthur Hollick. Price, 75 cents.

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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

A MONTHLY JOURNAL OF BOTANY.

EDITED BY

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.
A few Additions to the Hepatic Flora of the Manual Region: *Lucien M. Underwood*.......... 299
Interesting Oaks recently discovered on Staten Island: *Wm. T. Davis*.......... 301
Buchloe dactyloides, Engelm., not a diœcious Grass: *E. N. Plank*.......... 303
The Rhizomes of *Penthorum sedoides* as Leafy Shoots: *E. J. Hill*.......... 306
Variation in the Leaves of *Clematis reticulata* and other notes (Plate CXXXIII): *Charles Mohr*.......... 308
The Rediscovery of *Juncus Cooperi*: *F. V. Coville*.......... 309
BOTANICAL NOTES.—*Aster undulatus*; *Mikania scandens*; Hybrid or not? *W. W. Rowlee*; New Localities for Rare Plants: *Frank E. McDonald*.......... 311
REVIEWS OF FOREIGN LITERATURE.—The Lichen Genus *Cladonia*; Monograph of *Fontinalis*; Enumeration of Mosses of the Caucasus.......... 313
RECENT LITERATURE RELATING TO AMERICAN BOTANY.—Check List of the Plants of Kansas; New Desmids from New Hampshire; Dictionary of Botanical Terms; The Genus *Lindbladia*; Introduction to the Metaspermæ of the Minnesota Valley; Michigan Flora; Nomenclature; North American Helicosporæ; Notes on Exotic Fungi in the Royal Herbarium, Kew; Pink and Yellow Pond Lillies; *Salicornia mucronata*; Discovery of a new Grove of *Sequoia gigantea*; Some Results of Botanical Work in New Foundland; Variations and Intermediate Forms of Certain Asters; West Virginia Weeds; The Western Shad-Bush, and briefer notices.......... 318

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BULLETIN
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A Few Additions to the Hepatic Flora of the Manual Region.

It goes without saying that we have very little definite information regarding the exact range of any plant, and this is doubly true of any of the lower cryptogams, and especially those in which the interest is purely scientific rather than economic. It is fair to say that we do not know the extent of the geographic distribution of even the most common species of Hepatics. Every new collector in States hitherto unexplored (and there are still States from which not a single hepatic has been picked) extends the known range of one or more species, and it will be years before we shall be able to form a just conception of the distribution of our Hepaticæ.

We note here the addition of a few species to the area of the 6th edition of Gray's Manual. It is more than likely that others still will be found, especially along our northern borders and in the mountain regions.

1. *Lejeunea Austini*, Lindb. Growing at the bases of trees at Kirkville, Onandaga County, N. Y. It belongs to the section *Eu-Lejeunea*, and can be recognized easily by its shining golden green tufts. Its previously known range extended from South Carolina to Louisiana.

2. *Diplophyllum Dicksoni* (Hook.) Dumort, has been sent in from Northern Minnesota (*F. F. Wood*), and from Mt. Desert, Maine (*Rand*); outside our limits it has also been sent from Newfoundland (*Waghorne*). Its previous range in this country included only California, where it was once collected by Bolander.

It verges toward *Jungermannia* § *Sphenolobus*, of which *J. minuta* is a well known representative.

3. *Diplophyllum albicans* (L.) Dumort, has been found at Mt. Desert, Maine (*Rand*). It is found in various parts of British America ranging from Nova Scotia to Vancouver; Mr. Waghorne has also sent it from Newfoundland, where it seems to be quite common. *D. taxifolium* (Wahlenb.) Dumort, given in the Manual as a variety of this species, must be regarded as distinct.*

4. *Mylia anomala* (Hook.) S. F. Gray. Collected sparingly at Mt. Desert, Maine (*Rand*) and more abundantly in Connecticut (*Evans*), whence we shall be able to distribute it in the next issue of *Hepaticæ Americanæ*. It is distinguished from *M. Taylori* by having both acute and obtuse leaves on the same stems, as well as by its general habit.

5. *Kantia arguta* (N. & M.) Lindb. Growing over flower-pots in the greenhouse of Mr. James Ritchie, in Philadelphia, Pa., collected by Mrs. Mary P. Haines and communicated from the Torrey Herbarium; specimens also in the Roy collection are now in my possession. This is evidently an introduced plant brought from Europe, like *Lunularia vulgaris*, and growing in similar situations.

6. *Fossombronia cristata*, Lindb. Growing on clay banks at Fern, Putnam County, Indiana, November, 1891; what appears to be the same thing was collected at Readville, Perry County, Ohio, October, 1891 (*Werner*). These are undoubtedly the forms that were confused by Sullivant and others with *F. pusilla;* we have not seen fertile specimens of the last named species from this country, and it is useless to attempt to name sterile specimens of this genus.

7. *Metzgeria furcata* (L.) Dumort. In reviewing a large series of specimens of *Metzgeria*, nearly all of which are sterile, we find several which have the thallus characters of *M. furcata*, which in the sterile state is too close to *M. conjugata* to be agree-

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*Besides the three species mentioned above, we have two additional ones from N. W. America; *D. obtusifolium* (Hook.) Dumort, and *D. argentea* (Tayl.) Spruce.

able.* The stations for *M. furcata* are North Conway, New Hampshire (*James*); Lancaster County, Pennsylvania (*Porter*); Delaware Water Gap (*James*), North Carolina (*Ravenel*). *M. conjugata* has a much wider distribution.

In addition to the above the following corrections may be made:

P. 705, *Frullania Pennsylvanica*, Steph., should be stricken from the list, having been founded on some form of *Jubula Hutchinsiæ*, as we learn from Dr. Stephani himself.

P. 718. *Harpanthus Flotovianus* has been found by Mr. Waghorne in Labrador, as noted in the September number of the BULLETIN, and will doubtless be found in Northern New England. The words "certainly extralimital" were never our thought, and were added to the MS. after it left our hands.

P. 719. Var. *attenuata* will stand as a species and should read, *Jungermannia attenuata*, Lindenb.

LUCIEN M. UNDERWOOD.

Greencastle, Indiana, 27th July, 1892.

Interesting Oaks Recently Discovered on Staten Island.

By WILLIAM T. DAVIS.

I.—A number of black scrub oaks, *Quercus ilicifolia*, occupy the sandy ground at Watchogue on Staten Island, and associated with them, particularly in the dryer situations, are many Black Jack oaks, *Quercus nigra*. These trees are easily separated, and at Watchogue there are many hundred of each kind whose specific distinctions are obvious. There are also, in addition, a number of trees whose place is not so evident, and it becomes a question when viewing them as to whether they exhibit more of the characters of *ilicifolia* or *nigra*. They form, when taken together, a series leading from one species to the other, and apparently are hybrids resulting from the cross fertilization of the two.

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*Our species in the sterile state may be recognized as follows:

Thallus pubescent on both sides; costa covered on antical side by more than two rows of cells, *M. pubescens.*

Thallus pubescent on postical side and at margins; costa covered on antical side by two rows of cells.

  Costa covered on postical side by two rows of cells; marginal hairs long, curved or hooked, *M. hamata.*

  Costa covered on postical side by three to six rows of cells.

    Thallus decurved; marginal hairs in 2's or 3's, divergent.

      Thallus very narrow; costa large; hairs very abundant on costa and margins; (dioicous), *M. myriopoda.*

      Thallus broader; costa small; marginal hairs always twinned; (autoicous), *M. conjugata.*

    Thallus plane; marginal hairs not protruding: lamina usually with scattered hairs; (dioicous), *M. furcata.*

Though these trees vary considerably, individually they resemble *Quercus nigra* in being erect and rigid in growth, in their short, abruptly tapering branches, and in having the leaves rusty-pubescent beneath. They resemble *Quercus ilicifolia* in being small, in their smooth, light-colored bark, and in the retention of their dried catkins in abundance throughout the summer.

Occasionally a *Q. nigra* will retain its dried catkins in place late into the year, but with *Q. ilicifolia* it is a very usual feature.

One of the trees that bears the greatest resemblance to *Q. nigra* is erect in growth, about eight feet high, and the leaves vary in shape from the *nigra* form to that of *ilicifolia*. They are more rusty-pubescent beneath than *nigra*, and the tree has a lighter appearance, owing principally to the color of its bark. Only two or three partly broken cups of last year's acorns remained on its branches, for it bore no fruit this year, but it retained its dried catkins in abundance.

Another tree, that is about six feet tall and has the under surface of the leaves rusty-pubescent, bore two abortive acorns this year, but retained its catkins. Still another tree near by, is erect, about six feet tall, and has the leaves whiter beneath than the last. It bore no acorns, but, like the other trees, retained its catkins. None of the remaining trees so far discovered, the tallest of which is fourteen feet high, bore any fruit at all this year.

At the other end of the island, at Rossville and Tottenville, *Quercus nigra* grows abundantly, but *Quercus ilicifolia* is absent, and a diligent search at these places resulted in the discovery of no such trees as those to be found at Watchogue.

The last edition of Gray's Manual contains a list of hybrid oaks, from which it appears that *Quercus nigra* gives rise, as one of the parents, to two forms. Thus it is known to cross with the

Shingle and the Willow oaks, producing thereby varieties that are recognizable and have in consequence been named. *Quercus ilicifolia* is likewise known to be one of the parents of a hybrid form. The cross between *nigra* and *ilicifolia*, however, is not mentioned, and as it is also a recognizable form I wish to propose for it the name of *Quercus Brittoni*, after Dr. N. L. Britton, who was born on the island, and who, with Mr. Arthur Hollick, has done so much in making known its flora.

II.—A single oak of much interest stands in a thick growth of trees in moist ground not far from the specimens of *Quercus Brittoni* mentioned above. It is sixteen inches in circumference several feet from its base, and once stood about twenty-five feet high, as proved by measurement, though in consequence of a decayed base the trunk is now partly prostrate. A considerable portion of the tree is still clothed in leaves, which are white-downy beneath, and it produces acorns, but neither the fruit nor the foliage is distinguishable from that usually borne by the diminutive *ilicifolia*, which commonly has a trunk no larger round than one of the branches borne by this tree.

Wood says of *Quercus ilicifolia*: "a shrub" three to four feet high; Eaton and Wright give two to eight feet, and Loudon, in his Encyclopædia of Trees and Shrubs, says: "This very remarkable little tree is generally found about three or four feet high; but in favorable situations it is sometimes found to reach the height of eight or ten feet." Lastly, in the recent edition of Gray's Manual it is mentioned as dwarf and straggling, and eight is given as the maximum height.

It will be seen from these facts that this tree has attained over twice the size heretofore accorded the species, which certainly makes it interesting and noteworthy.

Buchloe dactyloides, Englm., not a Diœcious Grass.

The common buffalo grass of the "plains" is well known to botanists. It begins to appear near the ninety-fourth meridian, and extends westward to the Rocky Mountains, northward into the British possessions, and southward to the sands of the Gulf coast. It is a grass of short stature, seldom more than six inches tall, though I have specimens collected in this State more than a foot high. Our species was formerly of great repute among stockmen in the central and northern parts of its range as a winter forage plant. Much of the credit given to it belongs, however, to species of *Bouteloua*, especially to *B. hirsuta* and *B. oligostachya*. It usually neighbors closely with those grasses, which are regarded by many ranchmen as merely forms of it. While doubtless a very nutritious grass, its manner of life adds very much to its value. It has a way of sending its roots down ten or fifteen feet, which, combined with its stoloniferous character and its numerous curling linear leaves, enables the plant to live and thrive under most unfavorable climatic conditions. Naturally almost hay, it readily cures under the dry, hot winds into a valuable fodder for the wild deer and the wild buffalo, as well as for their successors, the hardly less wild steers of the cattlemen. Farther east and south, it largely yields place to more luxuriant grasses.

The history of our subject is interesting from the fact that, for a long time after its discovery, what has hitherto been regarded as its true character, was unknown to botanists. Nearly seventy five years ago, Nuttall discovered the staminate form and named it *Sesleria dactyloides*. In 1855 Steudel named the pistillate form, collected by Drummond, *Antephora axilliflora*—no botanists at that time recognizing the relationship of the two forms. In 1859 the late Dr. George Engelmann, of precious memory to botanists, received what he considered a mere sprout of the plant, a form bearing both staminate and pistillate flowers, but borne on distinct stalks proceeding from different parts of the same rootstock. The practiced eye and judgment of Dr. Engelmann saw at once that *Sesleria dactyloides* and *Antephora axilliflora* were forms of the same plant. Supposing that he had before him a diœcious grass so distinct from all others as to possess generic characters, he founded a new genus and named it *Buchloe*, a contraction of Bubalo, Greek for the Old World buffalo, and chloa, grass.

Great and important facts and principles in science and philosophy often lie around loosely, and cuffed and are kicked about for years, sometimes for centuries, because great men, strongly intent upon another and more remote object, overlook that which is near by and under foot. The sheep-like world follows the leader until a chance observation reveals the proximate fact, and then every one wonders why every one had not seen it before. From my first introduction to buffalo, about twelve years ago, and without personal knowledge of the plant in its original monœcious form, but knowing that such a form existed, I was led to doubt the correctness of Dr. Engelmann's conclusion that it is really a diœcious grass. The presumption of doubt strengthened when I found an individual plant bearing both staminate and pistillate flowers. Further experience confirmed my strong notion into what may be considered to be a fact.

During one of my botanical rambles in Kansas, while walking over soil newly moved by a freshet, I noticed the peculiar appearance of the individual plants of buffalo grass growing upon it. There were scores of them, if not hundreds. All of them appeared to be seedlings, having yet not sent out stolons. All of these plants were monœcious. That seems to be sexually the original character of the species. The fact of the unisexual flowering stems, proceeding from different parts of the plants, with its stoloniferous character generally increasing and spreading in that way, will fully account for its diœcious habit.

The facts of the rapid disappearance of the species with the advent of civilization and agriculture, the paucity of pistillate plants, and that the pistillate form, like the staminate one, is seldom, if ever, found growing singly, can now be easily explained. The staminate stolons are much stronger than the pistillate ones, so that they easily outgrow and overrun the others, becoming sometimes two to five or more feet long. There are probably a thousand individuals of the staminate form to one of the pistillate. The few large seeds are eagerly sought by animals. They are often, too, destroyed by a beetle. Seed-bearing individuals being thus easily destroyed, few seeds remain for reproduction, and much of that which remains only aids in giving the stronger form more chance in the race of life. So when either form is destroyed its destruction is complete.

If carefully conducted experiments in growing plants of buffalo grass from its seed should show that the plants before they send out stolons are always, or generally, diœcious, which cannot be, as these are too monœcious plants, then Dr. Engelmann's theory of the sexual character may be correct. In the absence of such proof, if we are true philosophers, we are obliged to accept the nearest-by theory that explains the phenomena that the life, character and life-work of our plant presents; and pronounce it to be originally, as it comes from the seed, a monœcious grass, bearing unisexual flowers upon stalks arising from different parts increasing itself mainly by stolons proceeding from sexually different parts of the plant, each reproducing its own form.

E. N. PLANK.

BRENHAM, TEXAS.

The Rhizomes of Penthorum sedoides as Leafy Shoots.

In August, 1891, a *Penthorum sedoides*, L., was taken from the wet sand of a ditch and placed in a glass jar of water in which aquatic plants and animals were kept for study. About three months afterwards it was taken out of the jar to be thrown away, since the leaves had fallen off and the stem was mostly dead, and it was thought to be of no further use. Finding the subterranean stems, which were three or four in number and from two to three inches long, thickly covered with leaves, the plant was replaced in the jar for further development; the shoots had not attracted attention before, as they were in the midst of stems of *Anacharis*, which they resembled closely enough to be overlooked. At the beginning of the past summer most of these leaves had dropped off, but one stem had a living bud and some fresh leaves after more than a year's time had passed. The rhizomes have behaved like an aquatic, floating in the water in which they have been immersed, and receiving plenty of light but no food except what has been furnished by the stem and the water. The leaves are of a deep green color, and are closely imbricated, they are sessile, narrowly oblong-oblanceolate, acute, and finely serrate. They are from three to five eighths of an inch long, thickish, or inclined to be fleshy. A minute bud is found in the axile of each; they are very much crowded, and are apparently eight-ranked. They call to mind species of *Sedum*, especially *S. acre*, by the imbricated leaves, their small size and general appearance, though not so fleshy. Under the conditions to which it has been subjected, the plant assumes the look of one belonging to another genus of the same family, but of a different habit, since the stone-crops are frequenters of rocks and dry places. This may show a common origin in which the ancestor of *Penthorum* resembled *Sedum* more closely than at present.

The behavior of these subterranean stems in water may also throw some light on the true place of *Penthorum* in the natural system, since it has been a matter of dispute. *Penthorum* and *Diamorpha* forming the group Diamorpheæ, and usually included with Crassulaceæ, are placed by some with the Saxifragaceæ. La Maout and Decaisne metion them in this connection, plainly regarding them as more closely allied to the latter than to Crassulaceæ, " whose relationship they evidently reject by their several-celled ovary." Schönland, who prepared the article "Crassulaceæ" for Engler and Prantl's Pflanzenfamilien, makes a group of *Penthorum*, *Diamorpha* and *Triactina*, and places them in his arrangement nearest to Saxifragaceæ. They are thought to be more nearly related to *Sedum* than to other genera of the order, or pointing to *Sedum* for their parentage. The small, crowded and somewhat thickened leaves borne by these spreading subterranean shoots, or stolons, of *Penthorum*, (since they also start from the stem above ground and form true stolons), make this relationship still more apparent, and help to remove one objection to placing it with the Crassulaceæ. Schönland writes as follows with regard to this relationship: "The Crassulaceæ constitute a very natural group of forms. The only genus that has been separated from them by recent authors is *Penthorum*, which Baillon has placed with the Saxifragaceæ. Its possession of membranaceous and not fleshy leaves cannot be alleged as the sole ground for this, since many species of *Crassula*, *Vialanchoe*, etc., also have quite thin, but slightly thickened leaves. Hence it may be recommended to leave *Penthorum* here" (with the Crassulaceæ.)*

E. J. HILL.

ENGLEWOOD, CHICAGO, ILL., Sept. 6, 1892.

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*Die Natürlichen Pflanzenfamilien, III Teil, 2 Abt. a., p. 28.

Variation in the Leaves of Clematis Reticulata and Other Notes.

BY CHARLES MOHR.

(Plate CXXXIII).

In Southern Alabama and on the eastern border of Central Mississippi, specimens of a *Clematis* have been collected, which in form and size of their leaves presented a habit so widely differing from the forms of *Clematis reticulata*, known to me at the time, from Florida and Texas, that I could not convince myself of the identity of the plants from the eastern Gulf region with that species. After having had, by the kindness of Dr. Geo. Vasey, opportunity for comparing them with the series of forms in the National Herbarium from the Southern Atlantic States and from Texas, all doubts on this point were dispelled. The variation in the size of the pinnate leaves, in the number of pinnæ, the size and shape of their leaflets exhibited by these plants from different localities, is very remarkable and of interest by their manifest connection with their geographical distribution.

The specimens from South Carolina and Georgia exhibit the most meager foliage, the leaves of a few pinnæ with the leaflets lanceolate to ovate-lanceolate and acute (Fig. 1 and 2). In the plants from Eastern Florida, the leaflets became more expanded, ovate forms and prevailing considerably longer than wide, more or less blunt with the tendency to palmate or digitate division, (Fig. 3 and 4), the simple leaves supporting the flower stalk remaining lanceolate and acute (Fig. 5). The plants from the eastern Gulf region show the greatest luxuriance in their foliage, the large leaves with from three to four and more pinnæ, bearing roundish to broadly ovate leaflets, but little longer than wide, blunt or emarginate and often slightly cordate at the base (Fig. 6 and 7), the opposite simple leaves subtending the pedicels, ovate and obtuse (Fig. 8 and 9). The specimens from Eastern Texas present a foliage somewhat intermediate between the latter and the Florida plants (Fig. 11 to 12).

These variations in the leaf form are easily explained when the difference in the moisture conditions are considered, prevailing in distant localities during the period of most active growth. Sparsely-leaved forms, with more narrow and acute leaflets, to all appearances predominate in the Southern Atlantic region, with a rainfall averaging ten inches during the spring, and fifteen inches during the summer months.

In Alabama and Eastern Mississippi, with a precipitation on the average of fifteen and of twenty inches respectively during the same seasons, the foliage is rich and abundant with large, rounded leaflets, whereas the Texan specimens, from a region with a precipitation similar to that of Florida, during the same periods, approach in their foliage the plants from that section.

In view of these facts, the position I have taken in my remarks made before the Botanical Club of the American Association for the Advancement of Science, at the Washington meeting in 1891, in regard to the specific character of the specimens of *Clematis* from the Eastern Gulf States has to be abandoned.

As worthy of record I would allude to the occurrence of *Quercus heterophylla* in Alabama. This tree, unknown to me, was pointed out by my companion, Mr. Sudworth, in our explorations of the forests of the southern banks of the Tennessee River in Morgan County. In all its characters, the tree presented not the slightest deviation from the forms found on the Atlantic slope. From the abundance of cups scattered below the tree, it is evident that it fruits freely and, as in other localities cited, it is found associated with *Quercus Phellos* and *Q. rubra*. This association, however, cannot be taken as a proof of its being a hybrid; the constancy of its characters under varying conditions of soil and climate, and its fecundity are the strongest proof of its specific value.

Mr. Sudworth has found this tree near Ann Arbor, Michigan, extending thus its geographical range to over about eight degrees of latitude, and spreading from the coast far into the interior.

The Rediscovery of Juncus Cooperi.

In the year 1868 Dr. George Engelmann published a description of a new *Juncus* from the southwestern United States, giving it the name *J. Cooperi.** A single specimen without rootstock or leaves had been collected by Dr. J. G. Cooper in 1861, in the vicinity of Camp Cady, a now abandoned military post situated about fifteen miles east of Daggett, San Bernardino County, California. Upon this one specimen all knowledge of the species has rested for thirty years.

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*Trans. St. Louis Acad. Sci. ii. 590 (1868.)

The Death Valley Expedition sent out by the U. S. Department of Agriculture entered Death Valley in January, 1891, and camped for several days at Bennett Wells. On the evening of our arrival I walked eastward from camp a few hundred yards to the margin of the salt marsh in the bottom of the valley, and there, amidst the other vegetation peculiar to the densely alkaline moist soil about the salt flat, I found in fruit a *Juncus* evidently related to, but clearly distinct from, both *J. Rœmerianus* and *J. acutus sphærocarpus*. A subsequent examination showed it to be the long lost *J. Cooperi*. It was subsequently found to occur in several places in Death Valley, about the old Eagle Borax Works, on the east side of the valley opposite Bennett Wells, about four miles south of Furnace Creek ranch, near the Coleman Borax Works, two miles east of the same ranch in Furnace Creek Cañon, and at Saratoga Springs. Eastward from Death Valley it was found at several places in Resting Springs Valley, California, and at Ash Meadows, Nevada, points in the watershed of the Amargosa River, and in the Vegas Wash, Nevada, about eight miles from the great bend of the Colorado River. West of Death Valley it was seen only at Hot Springs, Panamint Valley.

At all its stations the plant grows in soil like that described above, and in tufts sometimes composed of only a few stems or occasionally attaining the extraordinary diameter of 2 meters. Upon the new material collected, the following description is based:

Juncus Cooperi, Engelm. Trans. St. Louis Acad. ii. 590 (1868). Plant perennial, densely tufted, 60 to 80 cm. high. Roots large, unbranched and 2 to 3 mm. thick near the base, composed of a slender vascular central thread surrounded by soft parenchyma tissue and an epidermis; rootstocks short, closely branched; stems erect, rigid, terete or slightly compressed, striate, leafless between the inflorescence and the base; lower sheaths light brown, shining, bladeless, but with a filiform-aristate appendage about 10 mm. long; upper 1 to 4 sheaths stramineous to light green, bearing a stiffly erect spine-pointed terete leaf exactly resembling the stem; inflorescence paniculate, its lower leaves erect, exceeding the panicle, about 10 cm. or less in length, otherwise like the root-leaves; branches of the panicle erect or nearly so, 8 cm.

long or much shorter, mostly unbranched, terminated by a 4-to 10-flowered glomerule; flowers borne singly in the axils of white scarious cuspidate bracts, the very short pedicel similarly bibracteate; sepals 5 to 6 mm. long, oblong-lanceolate, cuspidate, coriaceous, shining, plainly but not prominently few-nerved, scarious-margined; inner sepals shorter, barely cuspidate; stamens 6, nearly equalling the inner sepals, anthers when moist about 2.5 mm. long by 1 mm. wide; ovary oblong, equalling the included style; stigmas 2 to 2.5 mm. long; capsule narrowly oblong, acute, 3-sided, exceeding the sepals by 1 mm. or less, rigid-coriaceous, 3-celled, valves spreading but slightly in dehiscence; seeds closely packed and misshapen, with a conspicuous raphe and short tails, body about 1 mm. long, oblong, reticulate, the areas themselves smooth or faintly reticulate, not lineolate.

This rush is most nearly related to Engelmann's *Juncus acutus sphærocarpus* (*J. robustus*, Wats.) and, less closely, to *J. Ræmerianus*. It agrees with both in its stiff, erect, stem-like, pointed leaves, pseudo-lateral inflorescence, and glomerate flowers; and differs from both in its simpler inflorescence and much larger flowers and fruit, from the former in its cuspidate sepals and narrower capsule, and from the latter in its rigid coriaceous sepals.

Since making the observations on the Death Valley specimens, I have found in the National Herbarium, under the name *J. compressus*, a specimen of *J. Cooperi*, collected by C. R. Orcutt, in 1868, at Borrego Springs, Colorado Desert, California. It is probable, therefore, that the species will be found more widely distributed in the deserts of southeastern California. Mr. S. B. Parish informs me that he has looked carefully for the plant at Camp Cady, its type locality, but has failed to find it. Dr. Cooper undoubtedly found the plant farther out in the desert than has been supposed, in some alkaline marsh.

FREDERICK VERNON COVILLE.

Botanical Notes.

Aster undulatus, L. One of the ligulate florets from a plant of this species was found to have three well-developed style-branches. The branches were all alike and also like the style-branches of other ligulate florets. The stigmatic papillæ were along their margins [as shown in I. 2 is the normal style of the ligulate floret and its branches].

Mikania scandens L. A floret of this plant was found which had two of its filaments united. All the anthers were slightly united and were not essentially different in shape or size from other specimens examined. The filament in this species is made up of two distinct parts. There is a joint in the filament about .25 mm. below the base of the anther. Above this joint the tissue is made up of cubical cells. Their walls are comparatively thick and the tissue which they form is transparent. In the rest of the filament the cells are elongated, and the tissue they form is not transparent. The union of the filaments, in the case under consideration, begins in the transparent tissue, but is complete only in the portion below the joint.

Hybrid, or not? In the March (1891) number of the BULLETIN, I called attention to the sterility of the achenia of *Solidago serotina.* Ait., var. *gigantea,* Gray, and mentioned that "this, taken with the place of growth and the intermediate character, would be evidence enough, at least, to suggest" that the plant is a hybrid. This judgment was based upon the principles governing the determination of a wild hybrid, as set forth in Bentham's "Handbook of the British Flora," P. L. I wish to add that a careful examination of the plants of this kind in the stations of our Flora has failed to show one filled seed. W. W. ROWLEE.

New Localities for Rare Plants. Hibiscus grandiflorus, Mx. —This well-marked species grows abundantly in an open swamp near White Hall, Greene County, Ill. This station is 70 miles north of St. Louis, and I believe the farthest north it has been recorded.

Though closely allied to the showier *H. Moscheutos,* it is readily distinguishable by the velvety pubescenee clothing the entire plant, cordate leaves and hirsute pods.

Veratrum Woodii, Robbins. At numerous times in the past few years, in the months of July and August, I have seen specimens of *Veratrum* growing on a brushy hillside near Upper Alton, Madison County, Ill. I only caught fleeting glimpses of it from a passing train, but so conspicuous a plant is *Veratrum* that it was easily recognizable as a member of the genus.

I have this season had an opportunity to examine specimens and find as I expected, that it was *V. Woodii.* It is a well-marked species, easily distinguishable from *V. viride.*

Some of the specimens were 5 feet in height, the huge panicle over 2 feet in length.

In Patterson's catalogue but one locality is given for this plant, namely, Hancock County, collected by Mead. Will likely be found in other localities in the southern part of the State, where it should be expected.

I have specimens collected near St. Louis, Mo., by Letterman.

FRANK E. MCDONALD.

Reviews of Foreign Literature.

The Lichen Genus Cladonia. The above is the subject of an extremely interesting paper, published in the spring of 1891, by G. Krabbe, of the Univ. of Berlin.

The investigations for this work were begun in 1880, therefore covering a period of ten years. The work is very complete and exhaustive; studies in the field and laboratory combine to make the whole a thorough history of the development story of this genus. It was undertaken, the author says, in reference to three special features. First, the significance of the upright portion of the thallus or podetium; second the peculiar morphological significance of the polymorphism exhibited by this organ; third the question of sexuality which he claims can be studied here with more certainty than in other genera, because the development of the apothecia can be more easily traced here. In regard to the morphology of the podetium, there is a difference of opinion among lichenologists, some claiming it is the upright portion of the thallus, others that it is itself the thallus, and that the horizontal portion which precedes its formation in an organ corresponding to the protonema of the moss. Krabbe differs from both these views, and considers the podetium the homologue of the fruit body of the ascomycetes. In this way is found another argument for the double nature of the lichen, though this is now so generally recognized, that throughout the article the regular fungus forms are spoken of as the ascomycetes without algæ and the lichens, as ascomycetes with algæ.

The hyphæ forming the podetium rise from the gonidial layer of the thallus, branches grow from the latter upright or at right angles in little tufts, till they break through the rind. These he calls fruit primordials, and they often carry up with them in their growth some of the gonidia of the layer from which they started. Before the primordials have broken through the surface, the ascus bearing hyphæ may arise. It is not possible in all cases to distinguish exactly where a cell ceases to be an ordinary hypha and becomes an ascus. Certain cells increase in diameter, and as one follows them upward, they are seen to end in ascus cells or asci. In some cases it was certain that these ascus branches originated from the primordial or sterile branches.

He divides the whole genus in two classes, according to the relative time of the differentiation of the fruit hyphæ from the sterile ones, or perhaps more correctly, the time of the origin of the fruit hyphæ. When they originate early in the life of the fruit body, then the latter is inclined to remain more or less simple in form, so in this class are placed all having simply formed podetia. In the second class are all the cup, funnel, and variously branching forms. It is in this latter class that the polymorphism before referred to reaches its highest development. The podetium, he claims, has the same morphological significance as the fruit-body of the ordinary fungus. In the latter group of plants this organ is so uniform in shape in related species, that it is made the ground of classification. Here is the single genus *Cladonia*, it varies in shape from a small conical projection, through a series of different forms till it reaches a structure like that of a well branched tree. The causes of this branching are very carefully traced, so far as they may be considered of purely mechanical origin, such as unequal tensions coming from various causes. In connection with this comes what is termed various grades of sterility of the fruit-body. Of course, this expression can only be used on the assumption that the podetium is a fruit-body and not a thallus. It is well known that many of these bodies produce no spores, and in reference to this the author says, all grades of sterility may be found, from the extreme, where there is no differentiation of sterile and fertile threads, that is where the fruit primordials compose the whole podetium, from this extreme up to that where large and well developed asci are formed, but which fail to produce any spores.

The next and possibly most important question discussed is that of sexuality. It may be noticed here in passing, that without question, the belief that this feature occurs in any class of lichens, and in fact, in any of the higher fungi, is slowly losing ground. The adherents of this theory have been obliged to retreat from group to group, till they reached the Florideæ, or red sea-algæ, where the proofs of sex are still considered conclusive.

Krabbe says there is no possibility of sexuality in the genus *Cladonia*, that is to say, no possibility of fertilization accomplished in any manner with which we are acquainted. The only indication which might in any way imply such an act, he describes as follows: In some instances the ascus-hyphæ, when fully grown and swollen out, forming large cells, apparently for the development of spores within, lose their character as ascus-hyphæ, and turn back to sterile ones. This is brought about by the apical portion of the cell changing its manner of growth, becoming smaller in diameter, and stretching up until it somewhat resembles a trichogyn, and the enlarged part at the base resembles an ascogon. Now he says of this, the resemblance to the real ascogon and trichogyn of the Florideæ is very slight, and there are always two points of difference, these are the thread or tubular cell resembling the trichogyn, may branch, and it always starts gradually from that part which rasembles the ascogon. In both respects this is unlike the development of the true ascogon. It is hardly possible for those accustomed to the teachings of the textbooks on general botany, and to the plates with the forked trichogyn of the Collemaceæ, taken from Stahl's work, to pass over this so lightly. The question will recur, what end is to be served by such a change of an organ.

The explanation of a certain element of the podetium forms a very striking feature of this most interesting article; that is, the presence of large numbers of soredia about the outer circumference of the podetia. The older writers on lichens regard these soredia as formed on this organ in the ordinary way by which this means of vegetative reproduction is accomplished. In short they consider it an argument in favor of the thallus nature of the podetium. In his description of them, the author says on the periphery of the fruit body there is often an entire mantle of these gonidia with their hyphæ threads, in other cases they are in little heaps. By following the development of these lichens it is seen that there is no possibility of these gonidia having originated from those in the thallus. This being admitted, there are only two other hypotheses possible. Either they must be the direct product of the hyphœ threads cut off by abstriction, or they must be foreign bodies which have found their way there from outside, and have clung there till the hyphæ on the outer part of the lichens have woven them in. The former hypothesis is untenable on the grounds that such a formation has never been observed, and this forms a strong argument for the fungus-alga theory of the lichen. If the gonidia were a direct outgrowth of the hyphæ threads they must have been found in the process of development. This leaves only one explanation, namely, that they are foreign bodies which have been borne to the podetium through the air. The author says there are many other indications of such an origin, and then discusses the question whether these little bodies come to the lichen already clothed with their hyphæ filaments, that is, as complete full grown soredia, or simply as naked algæ cells which afterward receive their covering from the lichen. He decides in favor of the former supposition, as only in two cases were naked algæ cells found on the lichen, and it was difficult to determine their fate. It was found that the outside surface of the podetium was loose in texture and thickly beset with little hooks curving over so that on the arrival of the soredia they were taken hold of and held fast, while the hyphæ threads from both soredia and podetium surface twine and interlace till complete union is formed. The philosophy of this curious arrangement is very evident. The podetium in its development grows by apical and intercalary growth in such a manner as to be unable to carry up the little providers of carbohydrates from the thallus below. So this lack is supplied from without apparently, in a purely accidental manner. There is, however, no more indications of accident than in many other instances, as, for example, pollination by wind-carried pollen grains.

To those who still doubt the compound nature of the lichen thallus this explanation of the origin and function of the outer gonidia of the podetium must seem extremely doubtful. For in this case not only is there a symbiosis between fungus and alga, according to the generally received notion of symbiosis, namely, where the parasite which is unable to get its own living lays hold of a host of suitable nature to supply its needs, and unites itself so closely to it as to become an integral part of it, but a second union occurs. Later on in the life of the plant, the fungus hyphæ, following their own manner of development, governed possibly by tendencies inherited from ancestors to whom the algæ were not a necessity, develop into an organ by such a manner of growth that it is impossible for them to carry with them their little supporters. This organ has an important function, that of furnishing spores to provide for the continuance of the species. Nature, ever ready with resources, now provides the little algæ from without, which in their turn seek out the plant requiring assistance, unite themselves to it, and "live forever afterward in peace and harmony." After all, this is no more wonderful than other processes which are held as well authenticated facts.

E. L. G.

Fontinalacees—Monographie des. J. Cardot. (Mem. Soc. Sci. Cherbourg, xxviii. 152 pages, 1892).

This work makes an epoch in the history of mosses, as the author claims for it the honor of being only the third monograph of a family of Bryophyta. Every type but one has been seen, and all the larger collections and exsiccatæ have been examined. The result is very satisfactory. Six genera are recognized, of which three, *Fontinalis*, *Brachelyma* and *Dichelyma*, are North American. Thirty-three species of *Fontinalis* with twenty-one in North America, adds ten to the number included in Lesquereux and James' Manual. The species are ranked in four grades, according to their importance—*F. antipyretica*, *F. biformis*, *F. disticha*, *F. Novæ-Angliæ*, *F. hypnoides*, *F. microdonta*, *F. dichelymoides* and *F. filiformis* taking first rank, whereas most of the new species rank third and fourth, *F. maritima*, *F. Kindbergii*, *F. Howellii*, *F. chrysophylla*, *F. Delamarei*, *F. mollis*, *F. Cardoti*, *F. involuta*, *F. tenella*, *F. Duriæi*, *F. flaccida* and *F. Langloisii* being additions to our list. *Dichelyma subulatum* is changed to *Brachelyma*, and *D. Swartzii* is reduced to *Hypnum fluitans*.

E. G. B.

Enumeratio Muscorum Caucasi. V. F. Brotherus. (Acta Soc. Sci. Fenn. xix. 170 pp. quarto, 1892).

This beautiful memoir is a very important contribution to geographical Bryology, and of much interest to American students, many of the species occuring on this side of the Atlantic.

Although the author claims to follow Lindberg in the nomenclature, we notice several discrepancies, which are interesting, as being also unlike Braithwaite's accepted names—*Encalypta* for *Leersia*, *Mnium* for *Astrophyllum*, *Ulota* for *Weissia*, *Orthotrichum* for *Dorcadion* and *Amphidium* for *Anœtangium*. The descriptions of new species are by Lindberg, Brotherus, Muller and Venturi, twenty-four Acrocarpi and ten Pleurocarpi being characterized. Four hundred and twenty Musci, six *Sphagna* and thirty-four Hepaticæ are listed. E. G. B.

Index to Recent Literature Relating to American Botany.

Ægagropilen—Ueber. G. Lagerheim. (Nuova Notarisia, iii. 89-95).

Albinos among Orchids. Anna Murray Vail. (Gard. and For. v. 395).

Amarantus crassipes. John M. Holzinger. (Bot. Gaz. xvii. 254-256, one plate).

Arisæma triphyllum—On the Development of the Embryo-sac of. D. M. Mottier. (Bot. Gaz. xvii. 258-260; one plate).

Aster amethystinus. (Gard. and For. v. 377, with figure).

This illustration, it is claimed, is the first ever published of the above species.

Botanical Tramp—A Rocky Mountain. F. D. Kelsey. (Zoë, iii., 108–113).

An account of the plants observed in a botanical excursion in the vicinity of Helena, Mont.

Botrychium Virginianum—On the Apical Growth of the Stem *and the Development of the Sporangium of.* C. L. Holtzman. (Bot. Gaz. xvii. 214-217; one plate).

Check List of the Plants of Kansas. Bernard M. Smyth. (8vo. pp. 34, Topeka, 1892).

1764 species and varieties of flowering plants and 164 ferns and mosses are enumerated, and their distribution indicated.

Cochlearia Groenlandica, L. Edward S. Marshall. (Journ. Bot. xxx. 225, 226, plate 326).

Connecting Forms among Polyporoid Fungi. Lucien M. Underwood. (Zoë, iii. 91-95).

An argument in favor of uniting some of the now recognized genera of this order.

Cypress Tree—A Large. (Meehan's Month. ii. 135).

With an illustration of John Bartram's tree near Philadelphia.

Desmids from New Hampshire—New. Wm. N. Hastings. (Amer. Month. Micros. Journ. xiii. 153-155, with plate).

New species and varieties are described and figured in the genera *Euastrum*, *Xanthidium*, *Staurastrum* and *Closterium*.

Desmids—How to Collect. Wm. N. Hastings. (The Microscope xii. 147–150).

Diamtoms of the Connecticut Shore, I. W. A. Terry. (Am. Micros. Journ. xiii. 185).

Diatoms of the Florida Coast—Notes on the. C. Onderdonk. (The Microscope, xii. 78, 79).

A new species, *Actinoptychus pentagonalis*, is noted.

Dictionary of Botanical Terms. A. A. Crozier. 8vo. pp. 202. New York. Henry Holt & Co., 1892).

A complete account of the terminology of modern botany has long been a great desideratum, and the work here noticed, to the production of which Mr. Crozier has devoted a great amount of research, will be welcomed by all botanical students. It covers the whole field of botany, including special terms used in agriculture and horticulture. In the progress of the science some terms formerly in use have become obselete, and most of these are omitted, although all which have any present application are retained. The very numerous synonyms are reached by cross references. In every case the pronunciation of the term is indicated.

The book is handsomely printed and well bound, and should find place in the libraries of all botanists. N. L. B.

Flora of Chicago and Vicinity—Notes on the. E J. Hill. (Bot. Gaz. xvii. 246-252).

Houttynias—The. (The Garden, xlii. 111).

A note on and illustration of *Houttynia Californica*

Lindbladia—On the Genus. Geo. A. Rex. (Bot. Gaz. xvii. 201-205).

A discussion of the history and characters of this genus of Myxomycetes, with description of *L. effusa*, var. *simplex*, n. var.

Living Fossils. E. H. Barbour. (Bot. Gaz. xvii. 223).

Description of the growth of a *Chara* at Fall River, S. Dak.

Mariposa County as a Botanical District, III. J. W. Congdon. Zoë, iii. 123–131).

This installment of Mr. Congdon's paper is mainly devoted to an account of the plants of the Coniferous Belt.

Metaspermæ of the Minnesota Valley—Introduction. Conway Macmillan. (8vo. pp. 36; Minneapolis, 1892).

This is the preface to a "Flora" of the region, prepared for the Geological and Natural History Survey of the State, reprinted in advance from the main document, which will be reviewed in these columns when issued.

Michigan Flora. W. J. Beal and C. F. Wheeler. (8 vo. pp. 180; Lansing, 1892).

This is a new catalogue of Michigan Plants, Anthophyta and Pteridophyta, prepared for the Thirteenth Annual Report of the Secretary of the State Board of Agriculture. It enumerates 1746 species and varieties, indicating the habitat and distribution, and citing localities for the rarer ones. The catalogue proper is prefaced by sixty-six pages of matter dealing with the economic aspects of the Flora, its geographical distribution, bibliography, herbaria consulted, manuscript lists employed, the effect of climate and soil on distribution, timber-trees, weeds, the procession of flowers, and many other notes of importance and value.

N. L. B.

Mobile Diatom Deposits. K. M. Cunningham. (Amer. Month. Micros. Journ. xiii. 169, 170).

A list of species identified by Dr. D. B. Ward.

Monstera deliciosa. (The Garden, xlii. 99. illustrated).

Native Shrubs of California. Edward L. Greene. (Gard. and For. v. 436).

Nomenclature– A Note on. Alphonse De Candolle. (Zoë, iii. 172, 173).

Translated from the author's note in French in the May issue of the Journal of Botany.

Nomenclature of Plants. Katharine Brandegee. (Zoë, iii. 166-172).

Nomenclature—Botanical. (Gard. and For. v. 362).

Comments on the circular sent out by the Committee of German botanists appointed to amend the laws of botanical nomenclature as adopted at the Paris Conference of 1867.

North American Helicosporæ. A. P. Morgan. (Journ. Cincin. Soc. Nat. Hist. xv. 39-52; 21 figures).

Descriptions and illustrations of the North American species of the genera *Helicomyces, Helicoma, Helicoon,* new genus, *Everhartia* and *Troposporium.* A number of new species are characterized.

Notes on American Wild-Flowers. Wilfred A. Brotherton. (Am. Gard. xiii 516).

With illustrations of *Dicentra Cucullaria, Asarum Canadense Liparis liliifolia, Mitella diphylla* and *Smilacina racemosa.*

Notes on the Flora of Smythe County, Virginia. Anna Murray Vail. (Gard. and For. v. pp. 364, 375, 388, 424, 437).

Notes on Exotic Fungi in the Royal Herbarium, Kew. Geo. Massee. (Grevillea, xxi. 1-6).

Geaster involutus from St. Domingo, *Diatrype artocreas* from St. Vincent and *Dendrographium atrum* from the Amazon Valley.

are American species described as new, the latter a new genus.

Our Native Orchids. Francis Wilson. (Am. Gard. xiii. 518).

With illustrations of *Goodyera pubescens* and *Corallorhiza multiflora.*

Phyllosiphon, Kuhn—Neue Arten der Gattung. G. Lagerheim. (Nuova Notarisia, iii. 120-124).

Descriptions and illustrations of three new species from Ecuador.

Pink and Yellow Pond Lilies. W. W. Bailey. (Bot. Gaz. xvii. 229).

Record of a pale-yellow form of *Castalia odorata* from Cape Cod, where the pink form is abundant. Prof. Bailey notes also, the occurrence of *Lotus corniculatus* at Providence.

Recent Work in Systematic Hepaticology. L. M. Underwood. (Bot. Gaz. xvii. 218 220).

Relation of Certain Fall to Spring Blossoming Plants.—II. A. F. Foerste. (Bot. Gaz. xvii. 223-245).

Rhus—Notes on the Genus. T. J. W. Burgess. (Journ. and Proc. Hamilton Assoc. 1891-92, 119-130).

Root-Pressure—An Apparatus for Determining the Periodicity of. M. B. Thomas. (Bot. Gaz. xvii. 212-214; one plate).

Salicornia mucronata. (Meehan's Month. ii. 129; with colored plate).

The author of this note points out the erroneous use of the common name "Samphire" for *S. mucronata*, the true Samphire being an umbelliferous plant, *Crithmum maritimum*, extensively used on the English coast for pickles. *Salicornia herbacea*, the species common on European shores, especially along the Mediterranean, where during the last generation large quantities of it were dried and burned for its ashes, which then were used in the manufacture of glass and soap, was known as "Glass-wort," a name which is also used for the American species.

Sequoia gigantea—Discovery of a New Grove of. Wm. W. Price. (Zoë, iii. 132, 133).

Note on a group of six trees in Placer Co., Cal., believed to be the most northern known.

Shark River Diatoms. Albert Mann, Jr. (Sea Side Torch, iv. 143).

Smilax glauca. (Gard. and For. v. 424, with illustration).

Some Attractive Native Plants. L. H. Bailey. Am. Gard. xiii. 513).

Illustrations are given of *Cypripedium pubescens*, *C. acaule*, *C. parviflorum* and *Habenaria fimbriata.*

Some Results of a Year's Work. Arthur C. Waghorne. (Evening Herald, St. John's, New Foundland, June 15, 1892.)

Mr. Waghorne gives an interesting summary of the number of species of plants collected by him in Labrador and New Foundland, and makes especial reference to *Capsella divaricata*, found on the beach at Couche, stating that it has hitherto been found at but one place in North America, namely, the interior of British Columbia. But in this he is in error, for it was collected by Mr. J. A. Allen in 1882, on the seashore of the Dead Islands, Labrador, and is of very wide distribution on the Pacific Coast (see BULLETIN xvii. 311). N. L. B.

Strawberry Leaf—Interesting Variations of the. Mrs. W. A. Kellerman. (Bot. Gaz. xvii. 257. 258, illustrated).

Sugar Maple in Ohio.—A. (Gard. and For. v. 380, a full page illustration.)

Tendrils of Passiflora cœrulea. D. T. MacDougal. (Bot. Gaz. xvii. 205-212, one plate.

The Plea of Expediency. N. L. Britton. (Bot. Gaz. xvii. 252-254).

Variations and Intermediate Forms of Certain Asters. W. C. Warner. (Journ. Cincin. Soc. Nat. Hist. xv. 55-58).

A discussion of the *Asters* of the group Heterophylli, as they occur in Ohio.

Western Shad-Bush—The. (Gard. and For. v. 409).

Notes on the geographical distribution of *Amelanchier alnifolia*, with the reproduction of a photograph of the tree as it appears in Washington.

Your Weeds and Your Neighbor's. C. F. Millspaugh. (Bull. W. Va. Agric. Exper. Sta.)

Dr. Millspaugh, as botanist of the West Virginia Experiment Station, has made a thorough study of the weeds of his State, the results of which have appeared in a series of bulletins under the above title. Part II deals with the distribution of weeds, their bad points, uses for fodder, and chemical weed exterminators. Part III is a descriptive list of the weeds of West Virginia grouped in their natural orders. An even two hundred are enumerated, which are classified as follows:

	1st Class. Worst.	2d Class. Bad.	3d Class. Indifferent.	TOTAL.
Perennial,	42	45	38	125
Biennial,	13	6	1	20
Annual,	27	17	11	55
Total,	82	68	50	200

With many of the worst species a small engraving is given, showing the plant or a portion of it, and usually a characteristic part more magnified.

A list of the diseases for which the weeds—referred to by number—are used is given. There is likewise an extended list of the common names of weeds.

The farmers and the crop growers of West Virginia are fortunate in having such a thorough work upon their weeds placed within easy reach of all. B. D. H.

Yucca pollination. H. J. Webber. (Am. Nat. xxvi. 774).

Zygopetalum crinitum. A. H. (The Garden, xlii. 140).

A colored plate of the above species and notes on *Z. Burkei, Z. brachypetalum, Z. Mackayi, Z. maxillare,* and *Z. rostratum.*

Zygopetalum graminifolium. R. A. Rolfe. (Gardn. Chron. xii. 179).

The description of a new species from South Brazil.

1
2
5
11
3
4
12
9
8
7
6

VARIATION IN THE LEAVES OF CLEMATIS RETICULATA. Charles Mohr.

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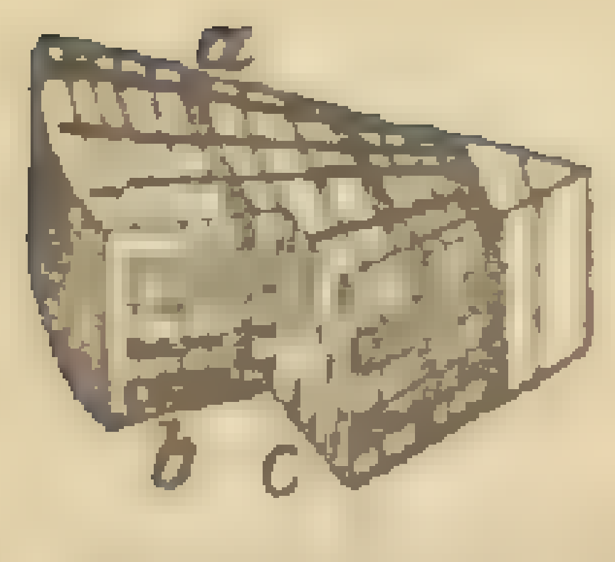

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EDITED BY

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.

The Nomenclature Question at Genoa: *Lucien Marcus Underwood*.............. 325
Palæobotany of the Yellow Gravel at Bridgeton, N. J.; *Arthur Hollick*........ 330
The Canby Herbarium: *H. H. Rusby*.... 336
Notes upon Maine Plants: *F. L. Harvey*. 340
BOTANICAL NOTES.—*Asplenium Bradleyi*, Eaton: *R. M. Middleton*. *Scabiosa australis*, Wulf.: *John H. Redfield*; Cleistogamy in *Cerastium viscosum*: *Thomas Meehan* 340
REVIEWS OF FOREIGN LITERATURE.—Monographie des Especes du Genre *Fraxinus*; Kreidepflanzen von Niederschona 342
RECENT LITERATURE RELATING TO AMERICAN BOTANY. — Amherst Trees: Dr. Kuntze and his Reviewers; Flowers and Insects; Fossil Flora of the Bozeman Coal Field; Fossil Plants at Hamilton, Ontario; The Fruit of *Garrya*; Revision of the North American Species of *Hoffmanseggia*; The Genus *Kunzia*; List of Plants collected by Dr. Edward Palmer on Carmen Island; List of Plants collected by the Steamer Albatross; New Mosses of North America: New or Noteworthy Species; Silurian Plants from Hamilton, Ontario; *Polygonum persicarioides*; Preservation of Plants as Fossils; New *Sphagna*; Systematic and Alphabetic Index of New Species of North American Phanerogams and Pteridophytes published in 1891; Teratological Notes; Tertiary Species of *Ficus* and briefer notices 343
PROCEEDINGS OF THE CLUB.............. 346

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BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XIX.] New York, November 15, 1892. [No. 11.

The Nomenclature Question at Genoa.

While I publish in the *Botanical Gazette* some more general points concerning my recent mission to Genoa, I give here a somewhat specific account of the action of the Botanical Congress in reference to the question of nomenclature. The Berlin committee was ably represented by its chairman, Professor Ascherson, who opened the question by reading (in French) abstracts from his published paper,* copies of which (in German) were distributed liberally among the members. In this paper Prof. Ascherson gives an interesting account of the origin of the work of the Berlin committee, the sending of the circular so familiar to us in America to 706 botanists, of whom 329 were German and the suggestions made by the various botanists who responded, together with their votes on the propositions I, II, III, and IV. The representation of American botanists in this vote is small. It may be of interest to know their opinions. The following voted for all of the four propositions: Brendel, Eaton, Hitchcock, Macoun, Meehan, Mohr, Parish, Redfield, Robinson, Seymour, Werthner. The vote of W. M. Canby is recorded for propositions II and III. Prof. Eaton makes the recommendation, which is not likely to be supported by many American cryptogamists, that for the priority of genera and species among ferns, we should not antedate Swartz*; among mosses, Hedwig†; among Algæ, Agardh‡; among lichens, Acharius§, and among Fungi, Persoon¶. For one, I would most vigorously oppose his proposed rejection of S. F. Gray's hepatic genera, for they can in no sense be regarded as "*nomina nuda.*"

---

* Berichte der Deutschen Botanischen Gesellschaft, Jahrgang 1892, S. 327-359.

The following memoranda from the botanists of the British Museum will also be of interest: "We do not quite agree with the first rule as stated. It appears to us that the genera should enjoy the same priority as the species, and should be quoted from the first edition of the Genera Plantarum, 1737. We do not approve of quoting an edition which was not published under the authority of Linnæus. If it were possible to adopt 1753 for both genera and species we would approve; but this does not seem to us to be possible. We therefore suggest that the first rule should read: The starting point of the priority of genera is the year 1737, and of species 1753."

The above bears date of 2d July. Under date of 27th July, they again write: "We do not see how we can stop short of 1737 in dealing with genera as *genera*. But as binominal names —and every specific name includes, of course, the generic as well as the trivial designation—did not exist until the publication of the 'Species Plantarum' in 1753, we agree that a name given in that work cannot be set aside for one, the generic part of which was ignored or set aside by Linnæus. And we, therefore, acknowledge that this *practically* fixes the date of genera to 1752.

Notwithstanding this reservation, the British Museum botanists are recorded as voting for the four resolutions, together with Braithwaite, C. B. Clarke, and a few others from Britain less known.

M. C. Cooke, A. W. Bennett and G. Massee subscribe to I, II and III; and Sir Jos. Hooker, Hemsley and B. Daydon Jackson, to propositions II and IV. The great majority of the votes came from the German botanists, and, with very few exceptions, were for the four original propositions as stated in the circular.

---

*Synopsis Filicum, 1806.

†Species Muscorum, 1801.

‡Species Algarum, 1823-1828.

§Lichenographia Universalis, 1810.

¶Tentamen Dispositionis Methodicæ Fungorum, 1797.

After the reading of Prof. Ascherson's paper, we were called upon to report the action of the American botanists. Fortunately, we had a limited supply of our Rochester circulars with us, and by distributing these before the report was given, the contents were more satisfactorily grasped during the presentation of the report.

In presenting the report we spoke substantially as follows:

"As delegate from the American Association for the Advancement of Science, I come direct from one of the largest and most harmonious gatherings of botanists ever held in America, and a part of my duty and pleasure is to report to this Congress our recent action in regard to the question of botanical nomenclature.

"As is doubtless well known in Europe, there has been, hitherto, much difference of opinion in America regarding the starting-point of nomenclature, and various botanists using different bases have produced considerable confusion. These differences had their origin in a dissent from the system so long held at Kew, which was more or less closely followed by our late lamented Professor Asa Gray. The possibilities recently opened by Otto Kuntze in the matter of upheaval of nomenclature, have precipitated a desire for *some* uniform and fixed system.

"The following report which I bring is the result of long-continued conference on the part of our botanists, and in passing upon the principles there was practical unanimity throughout the meetings. It will be seen that the system adopted by us is not widely different (so far as the two cover common ground) from that proposed by our German friends. I note one or two points of *real* difference which, though seemingly small, are important:

I. The American botanists urge the date 1753 instead of 1752 as the starting-point for both genera and species. Our reasons for this are: (1.) In Linnæus' *Species Plantarum* (1753) binominal nomenclature was first used in a comprehensive and systematic manner. (2.) The adoption of the later date will give a *single* starting-point for nomenclature instead of a double date. (3.) The adoption of the later date will necessitate less change in the generic and specific names now in common use.

II. "The American botanists urge that the adoption of '*priority of publication as a fundamental law*,' together with the orthodox principle of '*once a synonym, always a synonym,*' while causing some changes at first, will ultimately result in greater stability."

With this the Rochester resolutions were laid before the Congress. It is needless to say that the weight of authority represented in our platform, and especially the unanimity with which it passed our body, produced a marked impression on the Genoa Congress. The case was then fairly opened, and one proposal after another was brought forward and discussed in polyglot. Prof. Marshall Ward regretted the absence of any representative from Kew, and favored postponing discussion of the question on the ground of linguistic difficulties. But the Congress had long thought and were ready for some decisive action in spite of the greater conservatism of the English botanists. Some favored voting on all four of the Berlin propositions, but it was finally decided that it would be best to leave to a committee the fourth proposition and to vote on I, II, and III. It was at this point that the influence of the American resolutions was most strongly felt. An amendment was proposed which substituted 1753 for 1752 as the starting-point for genera. This modification was warmly discussed, and, guided more by instinct than by a clear understanding of the proper stage of the discussion, we were able in a few words to emphasize the superior advantages of the single date. At this juncture the vote was taken, and 1753 was adopted by a large majority. The three Berlin propositions as amended were then passed *nem. con.*, except that a later test vote to ascertain how many would prefer 1737 to 1753 resulted in four votes for the earlier date, mostly by Italian botanists.

Action on Proposition IV was deferred, and a committee of the Congress was appointed who should recommend what was deemed most feasible in that matter. On this committee your delegate served as a member, and the result of their deliberations was reported at a subsequent meeting of the Congress. The only remaining action was the endorsement by the Congress of a recommendation introduced by Prof. Prantl, which, in his own language, reads as follows: "Gattungsnamen, welche nicht im Sinne der binären Nomenclatur gegeben sind, sind zu verwerfen."*

---

* Ascherson's paper, *l. c.* 350.

At a later meeting, the committee appointed having considered the numerous questions that must of necessity arise in connection with the whole problem, to say nothing of the still unsettled Proposition IV and very important principles embodied in the Rochester resolutions, decided to recommend an International Standing Committee, composed of representative botanists, to whom such questions should be referred for consideration and recommendation. This committee will report at a future Congress, if not before.

The following Standing Committee was approved by the Congress. The appointment was in alphabetical order, but Prof. Ascherson is properly the chairman: Prof. P. Ascherson, Berlin; Prof. H. Baillon, Paris; J. G. Baker, Kew; Prof. A. Batalin, St. Petersburg; Prof. N. L. Britton, New York; Prof. E. Bureau, Paris; A. de Candolle, Geneva; Prof. T. Caruel, Florence; Prof. L. Celakovsky, Prague; C. B. Clarke, Kew; F. Crepin, Brussels; Prof. J. M. Coulter, Bloomington, Indiana; Th. Durand, Brussels; Prof. A. Engler, Berlin; Prof. Th. Fries, Stockholm; Prof. E. L. Greene, Berkeley, California; Prof. J. A. Henriques, Coimbra; Sir J. D. Hooker, Kew; Prof. A. Kerner von Marilaun, Vienna; Prof. F. Krasan, Graz; Prof. Joh. Lange, Copenhagen; E. Malinvaud, Paris; Dr. Fr. Müller, Varel; Prof. Perez-Lara; Prof. L. Radlkofer, Munich; Prof. P. A. Saccardo, Padua; Prof. J. Schmalhausen, Kiew; Prof. Suringar, Holland; Prof. M. Willkomm, Prague; Prof. V. B. Wittrock, Stockholm.

It will thus be seen that among the thirty members Germany has five representatives; Great Britain, the United States, Austro-Hungary and France have three each; Italy, Russia, Sweden and Belgium have two each; while Switzerland, Denmark, Holland, Spain and Portugal have each a single representative. To give each country a representation, and among the larger, one somewhat in proportion to the number of working botanists concerned, a better division could not have been made without making the committee unduly large and cumbrous.

So much, then, for the work of the Genoa Congress in its relation to nomenclature. As American botanists, we have every reason to congratulate ourselves that we are on the right track. So far as any action was taken at Genoa, it was directly in accord with the Rochester resolutions. The remaining resolutions, while not acted upon, were received with favor both in public and in private. It will only be necessary to make a forcible presentation of (1) what constitutes the publication of a species, and (2) the importance of our principle of homonyms, to carry conviction to the Continental botanists. Later conversations at Kew convince us that the English botanists will accede to any reasonable standard that promises uniformity and fixity.

LUCIEN MARCUS UNDERWOOD.

DEPAUW UNIVERSITY, October 10th, 1892.

Palaeobotany of the Yellow Gravel at Bridgeton, N. J.

BY ARTHUR HOLLICK.

(Abstract from manuscript in preparation for a bulletin of the United States Geological Survey. Read at the meeting of the Club on October 11, 1892.)

A year ago, in the course of an address in memory of the late Dr. John I. Northrop, before the New York Academy of Sciences, I expressed the hope that much of the work which he left unfinished would be completed by others, and not be lost to science. To me subsequently fell the responsibility of preparing a portion of his work for publication, and the results of such preparation form the basis of this paper.

Some ten years ago attention was first called to impressions of fossil leaves, in a more or less incoherent sandstone, occurring in the neighborhood of Bridgeton, N. J. No systematic study of the material was attempted, however, until many years afterwards, when Dr. Northrop took hold of it, and not only studied the specimens thus far collected but added largely to them by personal collection.

Much of the material first obtained was too poor for proper identification, but the later collections contain specimens well preserved, and afford good subjects for study.

The geological aspect of the matter I shall not discuss in this paper—that will be treated elsewhere. In what follows I propose to discuss the botanical facts involved, especially in reference to the efforts which have been made to compare and identify the fossil forms with genera and species now living.

All the material which is available for study and identification consists of leaves and pods, and the medium in which they are preserved is so coarse that much of the finer nervation and dentation is obliterated. Nevertheless, the specimens in general are very satisfactory, and from them the following species and genera have been identified:

Magnolia acuminata, L.

Magnolia glauca, L.

Asimina triloba, (L.), Don.

Ilex opaca, Ait.

Ilex Cassine, L.

Amelanchier Canadensis, (L.), Medic., var. *rotundifolia* (Mx.) T. & G.

Liquidambar Styraciflua, L. This is represented exclusively by a three-lobed variety. It so closely resembles *L. Europæa*, Al. Br., that I was at first inclined to refer it to that species, but as we have in Mexico a variety of *L. Styraciflua* with three lobes, there seems to be no reason why they should not be considered identical. The significant fact has also been pointed out to me by Dr. N. L. Britton, that young shoots of *L. Styraciflua* often bear three-lobed leaves, thus indicating that the ancestors of our five and seven-lobed species were represented by forms such as those from Bridgeton. If it should be proven that the Mexican variety is worthy of specific rank, then the Bridgeton fossil form should be renamed in conformity with it.

Nyssa uniflora, Walt. A number of irregularly and coarsely-toothed or entire leaves, which were at first mistaken for some species of *Quercus*, are evidently to be referred to this species. They appear to show even greater diversity in outline than the living species.

Nyssa Caroliniana, Poir.

Viburnum Bridgetonense, Britton. One of the most abundant species represented, and one of the first to attract attention. Dr. Britton was the earliest to note its generic relationship with *Viburnum*, and to propose for it the name which is here adopted. A large number of forms are included under this name, and it is probable that several new species, or even genera, might be separated from it. Some indicate relationship to *Vitis*, others to *Populus*, and further comparisons will have to be made before these points can be settled. In view of the fact that the leaves of *V. dentatum*, L. vary on the same bush, almost as greatly as do these fossils, it would seem as though a conservative attitude would be the safest, leaving to others the responsibility of seeing generic and specific differences in the many leaf-forms represented.

Leucothoë racemosa, (L.), A. Gray.

Clethra alnifolia, L.

Cinnamomum, sp ?

Laurus, sp ?

Persea Borbonia, (L.) Spreng.

Ulmus Americana, L.

Planera aquatica, Gmel.

Ioxylon pomiferum, Raf.

Morus, sp ?

Hicoria Pecan, (Marsh), Britton.

Ostrya Virginica, (Mill) B.S.P.

Quercus, sp? A number of entire, sparingly-toothed or irregularly-margined leaves have been referred to this genus, which apparently have affinities with *Phellos*, *imbricaria* or *heterophylla*, but, as a rule, the nervation is more or less obscure.

Castanea, sp ?

Amongst the remains of uncertain affinities two are very prominent by reason of their abundance. One of these is a large leguminous pod, with a dorsal suture and prominent wing. All attempts thus far made to identify it positively with any North American genus has failed. Its nearest affinities seem to be with *Mesoneuron*, *Pongamia* (*Derris*) or *Lonchocarpus*, but no leaves of either one of these genera have yet been satisfactorily identified. There would be nothing startling in the occurrence of an Eastern Asiatic genus amongst this flora, as *Diospyros* is common to both, and the well known similarity of the two floras at the present day has long been a subject of comment.

The other organism which has not yet been definitely placed is a reed or palm-like blade, with parallel nervation. Only fragments have been found, and these have been compared successively with palms, grasses and sedges, but without satisfactory results. Similar organisms have been described by Lindley and

Hutton under the name *Cyperites* and by Watelet as *Anomalophyllites* and it is possible that one of these names may have to be adopted.

It is to be understood that the above names are somewhat provisional, and may be changed in the light of some further material which yet remains to be figured and studied. No considerable alteration, however, will ensue, although several new species will doubtless be added.

From the above it will be seen that of the species which have been identified nearly all are such as are well known in the latitude of Virginia at the present day. In other words, at the time these leaves were deposited in the sands of Southern New Jersey a flora must have flourished there similar to that of Virginia to-day, demonstrating the existence of a warmer climate than now prevails there. The significance of this fact concerns the geologist more than it does the botanist, but, as a last word, it may not be amiss to say that apparently these fossils represent the most recent extinct flora of which we have any knowledge, and bring us very close to the living flora of to-day.

Plants Collected at Mt. Ktaadn, Me., August, 1892.

Mt. Ktaadn is not a single peak as some imagine, but a mountain with acres of table lands, broken by slight eminences and depressions. Its top is shaped somewhat like a horseshoe, and from one heel of the shoe around to the other it is perhaps seven or eight miles. This horseshoe encloses a basin of the same shape, which has nearly vertical walls two or three thousand feet high. The basin bears some resemblance to the crater of a volcano, except that it is open on one side, and this peculiar formation gives it an interest greater than that of most other mountains of the same height, which is about one mile. From the toe of the shoe a long ridge runs into the center of the basin, which affords an easier and less dangerous ascent than do the steep sides. There is a small pond near the opening from the basin, fed by little rills from the sides, which during heavy rains become considerable torrents, dashing down the almost perpendicular walls, carrying stones with them in their descent, and wearing gorges into the solid granite of which the mountain is composed. The base of the mountain is very irregular in shape, and must be at least twenty-five miles in circumference. On the northeast side is a pond which is doubtless the highest body of water in Maine. This is beautifully situated in a wooded hollow, and receives a little rivulet which plunges down a precipice a hundred feet or more, as near as I could judge from a distance. It has only been visited in the winter by men on snow-shoes. This pond is the headwaters of the Wissattaquoik stream, the principal tributary of the east branch of the Penobscot river.

The mountain seems to be composed of red granite. The top is broken into stones of all sizes, and the highest points are simply piles of these stones, which are covered with a yellow and a black lichen. There is some drift material, which would indicate that the mountain was covered with ice during the glacial period.

The base and sides are heavily wooded principally with spruce (*Picea Canadensis*), some fir (*Abies balsamea*), and yellow birch (*Betula lutea*), with a few other trees scattered among them. These grow smaller and smaller as they approach the top, and the spruce gradually gives way to fir, which finally becomes scrub. This is three or four feet high, usually dead at the top, and growing so closely together as to be almost impenetrable. A little farther up it dwindles away to a foot in height, so that one easily walks over the tops, sometimes on the interlaced boughs without touching the ground. A fir only three feet high was six inches in diameter, and a section showed over one hundred rings, which tells the story of its slow growth.

The other vegetation is principally alpine. All plants were low; three or four inches being as high as they could rear their heads. Everything hugged the ground as if its very life depended on it. Some plants not more than an inch high were in bloom, the flowers appearing to come out of the ground. *Carex rigida*, var. *Bigelovii*, *Juncus trifidus*, and *Deschampsia cæspitosa* were abundant, and covered some flat places, making them look quite like a lawn.

There were three other plants common all over the top of the mountain, in which I was interested gastronomically, as well as botanically. These were mountain cranberry (*Vaccinium Vitis-Idæa*), bilberry (*V. uliginosum*), and black crowberry (*Empetrum nigrum*).

We gathered these, stewed them with sugar, and found them a very good sauce. There was not much difference in their taste The cranberries were, perhaps, rather the best.

The plants in the following list I collected either on the top of the mountain or on the north side of the basin, on the slope facing the south. Some half-dozen are reported from this locality for the first time. Two others, *Agrostis canina*, var. *alpina*, and *Carex atrata*, var. *ovata*, are new to the State, and *Lycopodium alpinum*, has, I believe, never before been found in the United States.

Arenaria Grœnlandica, (Retz.), Spreng.
Potentilla tridentata, Ait.
Potentilla fruticosa. L.
Epilobium Hornemanni, Reich.
Heracleum lanatum, Michx.
Solidago Virga-aurea, L. var. *alpina*, Bigel.
Aster radula, Ait.
Gnaphalium supinum, Vill.
Arnica Chamissonis, Less.
Prenanthes Boottii, (D.C.), Gray.
Prenanthes Serpentaria, Pursh. var. *nana*, (Bigel.), Gray.
Campanula rotundifolia, L.
Vaccinium uliginosum, L.
Vaccinium Vitis-Idæa, L.
Chiogenes hispidula, (L.), T. and G.
Arctostaphylos alpina, (L.), Spreng.
Cassiope hypnoides, (L.), Don.
Bryanthus taxifolius, Gray.
Rhododendron Lapponicum, Wahl.
Ledum latifolium, Ait.
Diapensia Lapponica, L.
Castillea pallida, Kunth, var. *septentrionalis*, Gray.
Betula glandulosa, Michx.
Alnus viridis, D.C.
Salix Uva-ursa, Mx.

Empetrum nigrum, L.
Habenaria dilatata, (Pursh), Gray.
Listera cordata, (L.), R. Br.
Juncus filiformis, L.
Juncus trifidus, L.
Luzula melanocarpa, (Ehr.), Desv.
Scirpus cæspitosus, L.
Eriophorum alpinum, L.
Carex atrata, L. var. *ovata*, Boott.
Carex canescens, L. var. *alpicola*, Wahl.
Carex scirpoidea, Michx.
Carex rigida, var. *Bigelovii*, Tuckerm.
Phleum alpinum, L.
Agrostis hiemalis, (L.), B. S. P. (*A. scabra*, Willd).
Agrostis canina, L. var. *alpina*, Oakes.
Cinna pendula, Trin.
Agropyrum violaceum, Lange.
Lycopodium Selago, L.
Lycopodium annotinum, L. var. *pungens*, Spreng.
Lycopodium alpinum, L.

F. P. BRIGGS.

ORONO, Me., Oct. 18, 1892.

The Canby Herbarium.

The large and fine herbarium of Mr. Wm. M. Canby has been purchased by the College of Pharmacy of the city of New York, and will be deposited in their new building, now in process of erection upon 68th street, near the Boulevard. This, in connection with the herbaria of Columbia College, of the Torrey Botanical Club and of several private individuals, will probably render this city the most favorable point in the country for the study of collections. In announcing the purchase at a recent college meeting, Prof. Rusby read the following sketch of the herbarium:

Mr. William M. Canby is a citizen of Wilmington, Delaware, distinguished at home for his financial station as the president of the Wilmington Savings Fund Association and his connection with various railway enterprises, as well as for his personal character and public service, and throughout the scientific world for his fine abilities as a systematic botanist. His early fondness for botanical pursuits found a welcome opportunity for gratification when a bronchial trouble drove him to Florida early in the year 1858.

The tedium of an exile from home was altogether overcome when the pine woods about Magnolia, on the St. John's River, were brightened by the flowers of early spring. It was the collection made at that time which was the foundation of his herbarium. Coming homeward by way of Savannah and Aiken, South Carolina, quite a large and varied collection was made. This was supplemented in August by a month's botanizing in the mountains of southwestern Virginia, especially about the cliffs of New River and the Salt Pond Mountain. A two months' visit to Europe next opened some opportunities for exchange and correspondence.

Up to August, 1860, efforts were mainly confined to obtaining specimens of the flora of Delaware, eastern Pennsylvania and the pine barrens of New Jersey. At the date mentioned an extensive journey was made to New York, New England and Canada. The collections made at this time enabled him to exchange extensively with botanists in the three Western States of Ohio, Indiana and Illinois, as well as with some in New England and New York. Among these may be mentioned Dr. Vasey, Messrs. Hall and Bebb, of Illinois; Watson, Hale and Lapham, of Wisconsin; Sullivant, of Ohio, Dr. Sartwell and Judge Clinton, of New York, and several in New England. Prof. Porter and Dr. Traill Green, of Pennsylvania, were also most esteemed correspondents.

About this time, also, Mr. Canby became acquainted with Drs. Gray, Torrey and Engelmann, and active correspondence and most valuable exchanges were the result. The immense stores of foreign botanical treasures which at that time came to Dr. Gray were freely shared with Mr. Canby. He also became a purchaser of all valuable sets of American plants which he could find. The first of these were those of Dr. Parry and Messrs. Hall and Harbour, made in the then new country of Pike's Peak and the other Colorado mountains and the plains at their base.

He also purchased from the late Charles Wright more than two thousand numbers of his Cuban collection.

At the death of Mr. Sullivant his large collection was sent to Dr. Gray, and through his kindness the whole of the foreign collection was incorporated into the Canby Herbarium. This was particularly rich in the Spanish and Grecian collections of Boissier, in the Siberian and Altai collections of Bunge and Ledebour, in the Italian collections of Tenore and Gasparini, and in a large and valuable representation of the plants of France and Germany. He also obtained a part of the Venezuela collection of Fendler and a goodly number of that of Mandon and other collectors in the cordilleras of South America. He also received very many specimens from Schultes Bipontinus, Dr. Schnor and Karl Keck, of the various German countries, from Prof. Parlatori, of Italy René Lenormand, of France, and many others.

From Prof. Lenormand was also received a very fine collection of the peculiar flora of New Caledonia which had been placed in his hands for study and distribution. While on the subject of foreign specimens, I must not forget to mention the many thousands of species received from Baron von Mueller, of Australia, Prof. MacOwen, of South Africa, and Dr. Cheeseman, of New Zealand.

In this country Mr. Canby has exchanged with every one he could find who made good specimens and has purchased all the collections of Curtiss, Hall, Bolander, Kellogg and the other California and Oregon botanists. Later he corresponded with Prof. Post, of Syria, and received almost the whole of his excellent collections in Lebanon and the Holy Land. Mr. Ball sent him almost innumerable specimens from his herbarium, a very rich one, and also a suite illustrating his flora of Morocco. Besides this he made an excursion to Colorado and one to California, which resulted in the acquisition of several new species and many valuable specimens. In 1868 he again spent a winter in Florida, coming North as before by way of western South Carolina and Virginia.

This resulted in the gathering of about 12,000 specimens which were most valuable for exchange, as well as in a more direct way. He has also, either alone or in company with Drs.

Gray and Engelmann, Prof. Sargent and Mr. Redfield, made many excursions to the mountains of North Carolina, the results of which told largely upon the value of his herbarium. He also purchased the fine collection of Fendler in Trinidad, of Garber, Sintenis and others in Porto Rico, of Garber in South Florida, of Pringle, Palmer, Parry and Palmer, and others in Mexico and the border States, and has unusually full sets of the various government collections and of the various collectors of Sandwich Island plants.

The very extensive collections of Dr. Rusby in Arizona and New Mexico and in South America, and that of Mr. Bang in the latter continent are incorporated in the herbarium, as are also the valuable collections of Prof. Greene, of Mrs. Austin and Mrs. Ames, and of Prof. Lemmon, Dr. Parry, Messrs. Jones, Parish, Orcutt, Howell, Cusick, Tweedy, Suksdorf and many others in the far West and South. Most valuable and full collections were received from Dr. Mellichamp, of South Carolina, illustrating Elliott's flora.

Lastly, as one of the botanists of Mr. Villard's North Trans-Continental Survey, a full suite of all the collections made by it, and a most valuable one it was, came to this herbarium. In this were a number of new species, and many others so rare that they were only known before by single poor specimens. With these have come the collections of the Canadian Government Survey and a large contribution from Prof. Macoun's private collection.

From this it will be seen that during thirty years no collection which enterprise and money could secure has failed to become represented in the Canby Herbarium. The result is really a great one. With the Wood Herbarium and other specimens now in our collection, our Herbarium will number very close upon three hundred thousand specimens.

As regards the value of the herbarium I will hazard the opinion that $10,000 would not cover the actual cash outlay upon it. Add to this the thirty-four years of assiduous care on the part of the owner, and an amount by other distinguished scholars perhaps aggregating as much more, and you can judge whether $25,000 would not be a low estimate of its value. Its scientific value is, of course, beyond all estimate.

Notes upon Maine Plants.

Astragalus Robbinsii, which Mr. Fernald gives in his recent catalogue was probably included from a specimen found in the Blake Herbarium, which is really *A alpinus.*

Potamogeton mucronatus was probably included from specimens collected about Orono, by Mr. Fernald. The specimens contributed by him to the College Herbarium, under the above name, are *P. pusillus*, L.

Potomogeton rufescens, not included in Mr. Fernald's catalogue, has been collected by Miss Kate Furbish in Maine, and specimens are in her herbarium.

Potamogeton pulcher was found in a package of pond-weeds in the Blake Herb., marked in the hand writing of Rev. Joseph Blake, as having been collected at Wells, Me.

Nasturtium sylvestre, marked questionable in Mr. Fernald's catalogue, has been collected by Miss Kate Furbish at Moosehead Lake, Me.

Panicum agrostoides, was collected August, 1891, on gravelly shores of Chemo Pond, Bradley, Me., by Mr. F. P. Briggs.

Litorella lacustris was collected August, 1891, submerged in shallow water on the sandy shores of Chemo Pond, Bradley, Me.

F. L. HARVEY.

Botanical Notes.

Asplenium Bradleyi, Eaton. It has been generally assumed that this fern is intermediate between *A. ebeneum* and *A. montanum.* This was the view of Prof. Asa Gray, and Prof. D. C. Eaton expresses the same opinion, which was apparently shared by the late Dr. Sereno Watson. A very careful study of a good series of specimens from the Carboniferous Sandstone Bluffs of the Cumberland Mountains, in the Sequachee Valley, Marion County, Tennessee, has convinced me that *Asplenium Bradleyi*, has no close affinity with either. It would seem to be most nearly allied to *A. viride*, Huds.; indeed, plants from dark, cold rifts in the Sandstone, are scarcely distinguishable from *A. viride*, and I suspect that *A. Bradleyi* may perhaps prove to be a stouter and more luxuriant southern form of *A. viride*. Since this idea has been forced upon my own mind, I have heard from General E. Kirby Smith, who has observed *A. Bradleyi* for some years on the western face of the Cumberland Plateau, near Sewanee, Tennessee, and who writes, "The difference between *Bradleyi* and *viride* is so slight they might be varieties."

R. M. MIDDLETON.

Scabiosa (*Succisa*) *australis*, *Wulf.* On the 26th of September of this year, I found this species growing in considerable profusion on a wet road-side just north of South Mt., near Pittsfield, Mass. It was well established over a space of two rods in extent, spreading by its creeping roots. The first announcement of this recent comer to our Flora, was made in the Addenda to the new edition of Gray's Manual, and I am informed by Dr. B. L. Robinson that Prof. Dudley had a few years ago sent specimens to the Harvard Herbarium from Farley's Point, Cayuga Lake. reporting it as fully established there in low ground, and that in 1889, Miss J. E. Whitside had found it growing in an old cemetery near Hammondsburg, Pa. The plant is a native of middle and southern Europe, and perhaps came to us in the same way as did *Hieracium aurantiacum* nearly twenty years ago, and will probably get as firm a foothold as that has acquired.

Oct. 8th, 1892. JOHN H. REDFIELD.

Cleistogamy in Cerastium viscosum. Cerastium viscosum, I find equally cleistogene with *C. nutans*, which I have already reported in this connection. Our garden is kept so clear of "weeds," that only one plant has been left for my observation. I suppose there is no reason why the same conditions should not exist in other plants at this season (Oct. 15th) as in this one. Having but the one plant I will deposit it in the Herbarium of the Academy of Natural Sciences of Philadelphia.

THOMAS MEEHAN.

Reviews of Foreign Literature.

Monographie des Especes du Genre Fraxinus. Alfred Wesmael. (Bull. Soc. Bot. Belg. xxxi. 69-117.)

In this monograph of the Ashes the author recognizes twenty-three species, distributed among four sections of the genus based on floral characters. These sections are: I. Ornus, with hermaphrodite petaliferous flowers in a terminal thyrsus, represented in America by *F. dipetala*, Hook. and Arn., and *F. cuspidata*, Torr.; II. Fraxinaster., having apetalous flowers in lateral panicles, not represented in America; III, Sciadantus, flowers apetalous hermaphrodite, in simple umbels, this section including only *F. dimorpha*, Coss. and Dur. of North Africa, and IV. Leptalix with polygamous flowers, including the American species *F. Schiedeana*, C. and S., *F. Greggii*, A. Gray, *F. Americana*, L., *F. nigra*, Marsh. (*F. sambucifolia*, Lam), to which *F. Caroliniana*, Mill. (*F. platycarpa*, Michx.) is referred as a sub-species, *F. quadrangulata*, Michx., and *F. anomala*, Torr., and two Asiatic species.

The treatment of *F. Americana*, L., is characteristic of the present tendency of several botanists of continental Europe to throw similar forms into a single species if possible, and recognize under the species a very large number of sub-species and varieties, without regard to geographical distribution or the constancy of slight differences. So M. Wesmael groups under *F. Americana*, *F. pistaciæfolia*, Torr., *F. Novæ-Angliæ*, Mill (*F. viridis*, Michx.), *F. Berlanderiana*, D. C., *F. Pennsylvanica*, Marsh. (*F. pubescens*, Lam), and *F. Oregana*, Nutt, all of which, in our opinion, had better be maintained as species. He has evidently seen but very few specimens of any of them. N. L. B.

Kreidepflanzen von Niederschöna. H. Engelhart. (Sitzb. und Abhl. der Nat. Ges. Isis in Dresden, 1891, 79-105; Taf. ii.)

This illustrated description of cretaceous plants, found near the village of Niederschöna, Saxony, is of interest to American palaeobotanists, inasmuch as many of the species identified are well recognized from our own horizons of the same age—such as *Eucalyptus Geinitzi*, Heer, *Liriodendron Meekii*, Heer, *Diospyros primæva*, Heer, *Laurophyllum reticulatum*, Lesqx. *Widdringtonia Reichii*, Ett., etc.

The following new species are figured: *Pterophyllum Reichianum, Sterculia Geinitzi, Triplaris Cenomanica, Simaba Cenomanica, Salix Schœnae, Phacidium myrtophylli, Leguminosites cretaceus, Sapotacites Stelzneri, Mimusops ballotœoides, Sapindus Saxonicus, Chrysophyllum Velenovskpi, and Pinus, sp.*

A. H.

Index to Recent Literature Relating to American Botany.

Amherst Trees—James Ellis Humphrey (Amherst, Mass., 1892). A record of noteworthy native and cultivated trees in the vicinity of Amherst.

Anthoxanthum odoratum—Notes on the Flowers of. Theo. Holm. (Proc. U. S. Nat. Mus. xx. pp. 399-403, with plate; reprint).

Aristolochia gigantea. (Gard. Chron. xii. 341, illustrated.)

Aster sericeus. (Gard. & For. v. 473, with figure.)

Atriplices—New Californian. Willis L. Jepson. (Pittonia, ii. 303-306.)

Descriptions of *Atriplex depressa, A. cordulata, A. trinervata, A. verna*, and *A. fruticulosa.*

Bacterial Investigation of the Sea and Its Floor. H. L. Russell. (Bot. Gaz. xvii. 312-321).

Bomarea frondea. J. G. Baker. (Curt. Bot. Mag. t. 7,247.)

Calendario Botanico de San Juan Bautista y sus Alrededores. Jose N. Rovirosa. (La Naturaleza, (II.) ii. 106-126.)

Capparis flexuosa. J. D. Hooker. (Curt. Bot. Mag. t. 7,248.)

Compositæ—Studies in the. II.—Edward L. Greene. (Pittonia, ii. 287-290.)

A discussion of certain species of *Grindelia*, with descriptions of two new ones.

Cross and Self-fertilization. Minnie Reed. (Bot. Gaz. xvii. 330.)

Cryptogams collected by Dr. C. Willard Hayes in Alaska, 1891. Clara E. Cummings. (Nat. Geogr. Mag. iv. 160).

Daucus Carota—Notes upon. Chas. W. Hargitt. (Bot. Gaz. xvii. 328-330.)

Diagnoses of two new Genera. Edward L. Greene. (Pittonia, ii. 301-302).

Hesperalcea of the Malvaceæ and *Ramona* of the Labiatæ.

Dicraurus eptocladus, Hook. f. (Icon. Pl. xxiii. t. 2,227.)

Dr. Kuntze and his Reviewers. Edward L. Greene. (Pittonia, ii. 263-281.)

Professor Greene takes up the principal chapters which have been written in criticism of Dr. Otto Kuntze's "Revisio Genera Plantarum" and discusses them in his characteristically elegant style. Had we space at our command we would gladly reprint his entire paper, but must be content with commending it to our readers as an article which for erudition and execution must command their unqualified admiration.

Erythronium—Notes on certain Species of. E. B. Knerr. (Bot. Gaz. xvii. 326-328.)

Flowers and Insects—IX. Charles Robertson. (Bot. Gaz. xvii. 269-276.)

Account of the insects found visiting *Hydrangea arborescens*, *Philadelphus grandiflorus*, *Ribes gracile*, *Ludwigia alternifolia*, *L. polycarpa*. *Œnothera fruticosa*, *Gaura biennis*, *Circæa Lutetiana*, *Mollugo verticillata*, *Sambucus Canadensis* and *Houstonia purpurea*, with notes on floral structure.

Fossil Flora of the Bozeman Coal Field—The. F. H. Knowlton. (Proc. Biol. Soc. Wash. vii. 153, 154).

An abstract of the author's recent investigations, with a view to the determination of the age of the beds. Memoranda upon *Thinnfelda* and *Sphenopteris Lakesii*, Lesq., are given. From fruiting specimens this latter is now known to be an *Aspidium*. The flora is represented by forty-three species, of which three are new to science. A. H.

Fossil Plants, Hamilton, Ontario. C. C. Grant. (Journ. & Proc. Hamilton Assoc. 1891-92, 147, 148).

The author describes recent discoveries of fucoids allied to *Buthotrephis*, *Licrophycus*, etc., besides giving observations upon the supposed affinities of other organisms. This paper is sup-

plementary to a previous one published on pages 29-35 of the same journal.
A. H.

Fungous Diseases and their Remedies. James Ellis Humphrey. (Trans. Mass. Hort. Soc. part i. 103, 1892).

Furcræa pubescens. J. G. Baker. (Curt. Bot. Mag. xlviii. t. 7250).

Galeandra—The Genus. (Gard. Chron. xii. 430).

Garrya—The Fruit of. Edward L. Greene. (Pittonia, ii. 292, 293).

Professor Greene points out that the fruit of this genus is capsular rather than baccate, and that the capsule has circumsessile dehiscence, and contends that this character, taken in connection with others, should exclude *Garrya* from the Cornaceæ.

Gesnera cardinalis. (Gard. xlii. 232, with colored plate).

Hardwood Trees of Illinois—Notes on the. J. Schneck. (Hardwood ii, No. 5).

Hoffmanseggia—Revision of the North American Species of. E. M. Fisher. (Contrib. U. S. Nat. Herb. i. 143-150).

The author recognizes seventeen species as occurring in the United States and Mexico, of which *H. Texensis*, from Texas, *H. glabra*, from Lower California, and *H. canescens*, from Coahuila, are described as new. *H. stricta*, Benth., is reduced to a variety of *H. falcaria*, Cav., and *H. intricata*, Brandegee, to a variety of *H. glabra.* Numerous new varieties are described.

Mr. Fisher does not discuss the relation of *Hoffmanseggia* to *Cæsalpinia*, other than remarking that *H. caudata*, A. Gray, is related to *Cæsalpinia* "in respect to sepals, petals and pod." It may be noted that M. Baillon has united the two genera in his "Histoire des Plantes," and material which we have recently received from Bolivia renders that position easily defensible
N. L. B.

Kunzia—The Genus. Edward L. Greene. (Pittonia, ii. 298, 299).

Note that this name must replace *Purshia*, DC. (1818), not Raf. *Kunzia* was published by Steudel in 1821.

List of Plants Collected by Dr. Edward Palmer in 1890 *on Carmen Island.* J. N. Rose. (Contr. U. S. Nat. Herb. i. 129, with plates).

Drymaria diffusa, Desmanthus fruticosus, Passiflora Palmeri, *Houstonia fruticosa*, *Brickellia brachiata*, Gray, var. *glabrata* and *Euphorbia Carmenensis* are described as new.

List of Plants collected by the U. S. S. Albatross in 1888-'91 *along the Western Coast of America.* J. N. Rose, D. C. Eaton and W. A. Evans. (Contr. U. S. Nat. Herb. i. 135).

The new species described are *Oxalis Agassizi*, *Bryum cœlophyllum*, *Lophocolca apiculata* and *Schistochila quadrifida.* The two latter species are illustrated.

Live Oak—A Florida. Robert H. Lamborn. (Gard. and For. v. 483).

With illustrations of *Quercus Virginiana.*

Manglares in Ecuador—Die. Baron H. Eggers. (Bot. Centrabl. lii. 49).

Notes on *Rhizophora Mangle*, L., its habitat, manner of growth, and the various uses its wood is put to in Ecuador.

Mastigochytrium, eine nene Gattung der Chytridiaceen. G. de Lagerheim. (Hedwigia xxxi. 185-189, one plate).

Melanthus—The Genus. W. Botting Hemsley. (Ann. Bot. vi. 145).

Miscellaneous Notes. Marshall A. Howe. (Pittonia, ii. 291).

Notes on *Fucus evanescens*, Ag., *Gigartina radula*, Ag., from the coast of California, and on specimens of *Agrostis alba*, var. *vulgaris*, from Newfane, Vermont, with glumes four or five times the normal length.

New Mosses of America. F. Renauld and J. Cardot. (Bot. Gaz. xvii. 296).

Descriptions of *Dichodontium Olympicum*, from Washington, *Grimmia Hendersoni* and *Encalypta lacera*, from Oregon, and *Leskea obtusa*, from Pennsylvania and Louisiana.

New or Noteworthy Species. Edward L. Greene. (Pittonia, ii. 282; 293-298).

Micrampelis leptocarpa, *Xanthocephalum lucidum*, *Plagiobothrys campestris*, *Lotus sulphureus*, *Hedysarum MacKenzii*, var. *leucanthum*, *Claytonia nubigena*, *Eriogonum Davidsonii* (subsequently determined to be the same as *E. molestum*, S. Wats.), *Epilobium subcæsium*, *E. minutum*, var. *Biolettii*, *Ranunculus Turneri*, *Sambucus maritima* and *Habenaria maritima* are described as new.

Nicotiana tomentosa. J. D. Hooker. (Curt. Bot. Mag. t. 7252.)

Notes on Silurian Fossil Plants from Hamilton, Ontario. C. C. Grant. (Journ. and Proc. Hamilton Assoc. 1891-92, 29-35.)

The author takes up cudgels in defense of the vegetable origin of many organisms which have been classed as *Incertæ Sedis, Buthotrephis, Palæophycus and Palæochorda* are the subjects of interesting memoranda.

Notes on the structure of the Fruit-stone of the Date, Phœnix Dactylifera, L. J. L. Zabriskie. (Journ. N. Y. Micros. Soc. viii. 107-112, plate 37.)

Noticia y Descripcion de una Variedad de la Breweria Mexicana, Hemsley. M. M. Villada. (La Naturaleza (II.), ii. 127-128, one plate.)

Pasithea cærulea. J. D. Hooker. (Curt. Bot. Mag. t. 7249.)

Peperomia inquilina. W. Botting Hemsley. (Gard. Chron. xii. 428.)

The description of a new Central American species.

Plant Dissemination—A peculiar case of. Edward L. Berthoud. (Bot. Gaz. xvii. 321-326).

Argument for the distribution of plants through the migration of the Buffalo.

Plants and Insects—Some Interrelations of. C. V. Riley. (Proc. Biol. Soc. Washington, vii, 81.)

Pollination of Flowers—A Lecture on the. L. H. Pammel. Des Moines, 1892. Illustrated.)

Polygonum persicarioides, H. B. K. J. M. Holzinger. (Bot. Gaz. xxii. 295, 296.)

Notes on the species and record of its occurrence in Texas.

Prasiola—Ueber die Fortpflanzung von. G. de Lagerheim. (Ber. Deut. Bot. Gesell. x. 366, with plate.)

Preliminary Comparison of the Hepatic Flora of Boreal and Subboreal Regions. Lucien M. Underwood. (Bot. Gaz. xvii. 305-312.)

Preservation of Plants as Fossils. Jos. F. James. (Jour. Cin. Soc. Nat. Hist. xv. 75-78. Also reprinted.)

After a very commonplace and incomplete presentation of the subject the author winds up with what he calls the "chemical process," for an example of which he quotes the discolorations made by leaves which have fallen on a smooth pavement during a rain, which he regards as having "left their impress on the stone!" We offer this hint to those who are engaged in the study of nature printing processes as valuable. A. H.

Sida quinquenervia, Duchass. (Icon. Plant. pl. 2249.)

Sphagna—Einige neue exotische. C. Warnstorf. (Hedwigia, xxxi. 174-182, two plates.)

One would suppose that this genus had been pretty well explored in North America, but here comes Herr Warnstorf again with four proposed new species—*S. Labradorense,* from Labrador, received from Prof. Macoun; *S. dasyphyllum,* collected by Dr. Evans, at New Haven; *S. Orlandense,* from Florida, received from Prof. Eaton; *S. Mohrianum* and *S. Mobilense,* collected by Dr. Mohr, at Mobile, Ala.

Spiræa lobata. (Meehan Month. ii. 145, with colored illustration.)

Spirochæten—Notiz uber phycochromhaltige. G. de Lagerheim. (Ber. Deut. Bot. Gesel x. 304.)

A new genus *Glaucospira,* with two species *G. agilissima* and *G. tenuior,* from the vicinity of Quito, are described.

Systematic and Alphabetic Index of New Species of North American Phanerogams and Pteridophytes, published in 1891. Josephine A. Clark. (Cont. U. S. Nat. Herb. 1, 151-188.)

This most useful compilation will be of the greatest service to all systematic botanists. It gives, in addition to the names of plants proposed as new species, the new binomial combinations which have been in transfering species from one to another or in taking up older specific names. These new combinations are distinguished from the new species by the omission of the locality from which the plants were derived. It is highly gratifying to learn from a foot-note by Dr. Vasey, that it is proposed to make such a list an annual feature in the work of the National Herbarium.

Teratological Notes. Edward L. Greene. (Pittonia, ii. 261, 262; 299, 300.

Record of double flowers in *Delphinium patens* and *Triteleia* *laxa*, prolification in *Rosa lævigata*, tetramerous flowers in *Fragaria Californica*, phyllody of the tip of the spike in *Plantago lanceolata* (we have noticed this once or twice about New York), the production of two cherries from flowers of *Cerasus mollis*, and of the same duplication in the Peach. N. L. B.

The Islay. (Gard. and For. v. 469.) With illustration of *Prunus ilicifolia*.

Ueber Tertiäre Fagus-Arten der Südlichen Hemisphäre. C. F. von Ettingshausen. (Sitzb. K. Akad. Wiss. Wien., Jahrgang 1891, 114-137, Taf. i, ii.)

Twelve fossil species of the genus *Fagus* are described, ten of which are new. *F. Wilkinsoni*, *F. Etheridgei*, *F. Müelleri*, *F. ulmifolia* and *F. Shagiana* are figured on T. i. *F. Moorei*, nature printed, is represented by ten figures on T. ii.

Uredineen—Ueber einige in Sudamerika auf Berberis Arten wachsende. P. Magnus. (Ber. Deut. Bot. Gesel. x. 319, with plate.)

Variations of the Strawberry Leaf. C. B. Atwell. (Bot. Gaz. xvii. 336-337).

Woody Plants of Western Wisconsin. L. H. Pammel. (Iowa. Acad. Sci. i.; Pt. ii.)

Proceedings of the Club.

TUESDAY EVENING, OCTOBER 11, 1892.

Vice-President Allen in the chair, and nineteen persons present. Dr. Rusby was elected secretary pro tem.

The report of the Instruction Committee for 1892, was presented by its Chairman, Dr. Rusby, accepted and ordered on file.

Mr. Lighthipe reported upon several botanical excursions which he had made during the summer. North of Mountain House in the Catskills during the last week in August he had found *Arenaria Grœnlandica*, *Potentilla tridentata* (in fruit), and *Arctostaphylos Uva-ursi* (in fruit). At Haynes Falls, altitude about 2,000 feet, he had found *Cornus Canadensis* (in fruit), *Hieracium aurantiacum*, *Adlumia fungosa*, *Impatiens pallida*, *Habenaria Hookeri*, *Chiogenes* and *Monarda fistulosa*. At Bald Mountain near Scranton, about the same elevation, he had found *Potentilla tridentata*, *Asplenium montanum*, *Gentiana quinquefolia*, *Veronica scutellata*, *Polygala paucifolia* and *Rhododendron maximum*. In the vicinity of his own home near Woodbridge, N. J., he had found *Pentstemon lævigatus* var. *Digitalis*, and the white form of *Gerardia purpurea*. At Milburn N. J., he had found *Veronica Anagallis*. Near New Lisbon, N. J., he had found *Gyrotheca tinctoria*, *Sabbatia lanceolata*, *Cyperus*, *Torreyi* and *Lygodium palmatum*. In reply to a question by Dr. Rusby, Mr. Lighthipe stated that he had found only one color among the flowers of *Impatiens pallida*. Dr. Rusby spoke of a large, nearly white-flowered form which he had found abundantly in the Catskills.

Mr. Ogden reported that he had noticed a decided fragrance to the flowers of *Habenaria orbiculata* at Tannersville, N. Y., while in other places they were not fragrant. Dr. Rusby remarked that he had noticed the same phenomenon in *H. dilatata*, the flowers of some plants observed in Vermont and New Hampshire being exceedingly fragrant, while those of other plants were devoid of any odor.

Dr. Allen stated that twice in eight or nine years *Adlumia fungosa* had spread up the Chapaug Railroad in Connecticut, and had once become quite abundant near Litchfield, but it had hitherto failed to become permanent. He also stated that he had observed a form of *Chara aspera* which had acquired the habit of not fruiting, relying upon its underground tubers, containing starch, as a means of distribution. He had always supposed that owing to the strong mephitic odor of these tubers, they would not be grateful to water birds, but this season he had observed ducks feeding eagerly upon them. Dr. Allen also reported that he had obtained from Ohio a peck of the seeds of *Nelumbo* and sowed them in Litchfield Lake with the result that none sprouted. After some discussion by Mr. Hogg, who referred to other instances similar to this, it was thought probable that the failure to germinate had been due to the fact that the seeds had become more or less dry between the time of gathering and planting.

Mr. Hollick read the announced paper of the evening on "The Palæobotany of the Yellow Gravel of Bridgeton, N. J., illustrated by specimens and drawings.

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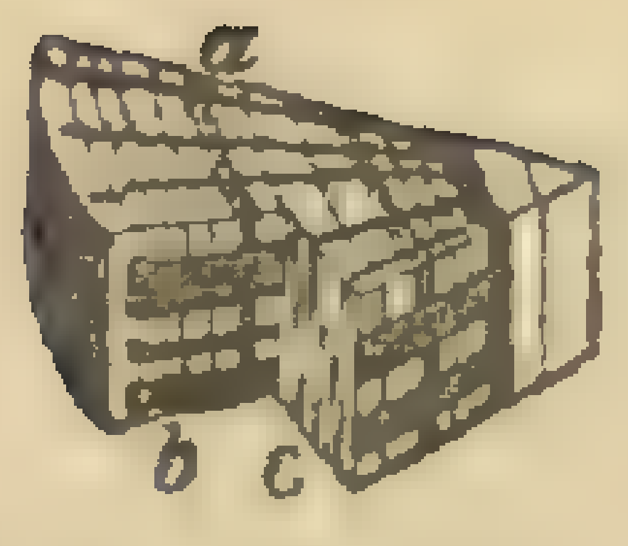

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OF THE

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A MONTHLY JOURNAL OF BOTANY.

EDITED BY

NATHANIEL LORD BRITTON,

AND OTHER MEMBERS OF THE CLUB.

CONTENTS:

PAGE.

A Preliminary List of American Species of Polygonum: *John K. Small*.......... 351

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XXII: *N. L. Britton*.......... 371

Phænological Notes: *L. H. Pammel*...... 375

BOTANICAL NOTES.—Systematic and Alphabetic Index of New Species of North American Phanerogams and Pteridophytes for 1891; Plantæ Schlechterianæ.................................. 382

RECENT LITERATURE RELATING TO AMERICAN BOTANY—Botanical Notes from Central Texas; Notes from Ontario; Description of New Plants Collected in Mexico by C. G. Pringle; Flora of West Virginia; Grasses of the Pacific Coast; Herbarium Indexes for all the Groups of Cryptogams; Post-Laramie Beds of Middle Park, Colorado; Museum Specimen of *Sequoia gigantea*; Flora of the Dakota Group; Trees of the Northern United States, and briefer notices. 383

PROCEEDINGS OF THE CLUB................ 391

DEATH OF DR. NEWBERRY................ 392

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BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XIX.] New York, December 15, 1892. [No. 12.

A Preliminary List of American Species of Polygonum.

By John K. Small.

The following list and notes are the results of some research on the genus *Polygonum* as occuring in America, and are preliminary to an exhaustive study of the morphology, histology and systematic classification of the genus.

The work was taken up at the suggestion of Dr. Britton and from a short study the suggestion proves to be a seasonable one, for it is time that some light should be thrown on the American species of this group of plants which is in such confusion and which has been so little understood by our best botanists.

The Columbia College Herbarium is especially advantageous for this work, for in it are preserved the collections and types of the late Dr. C. F. Meisner who spent so many years in the study of Polygoneæ. I have also been assisted much by Captain John Donnell Smith, Dr. Geo. Vasey and Dr. B. L. Robinson, all of whom have put their respective collections at my disposal.

The geographical distribution of the species is indicated by the citation of localities and collectors as represented in these four herbaria.

SECTION I.—BISTORTA.

1. Polygonum bistortoides, Pursh, Fl. Am. Sept. 271 (1814).

P. Bistorta, L. var. *oblongifolium*, Meisn., in D.C. Prodr. xiv. 126 (1856).

Colorado: Lake City (Pease); alpine parts of the Rocky Mountains (Parry); Wyoming: Yellowstone Park (C. H. Hall);

Nevada: Parley's Park, 6,000 ft. (Watson, 1068); Arizona: Williams (Rusby, 819); Mogollon Mountains (Mearns, 84); California: Santa Rosa Creek (Bigelow); foothills of the Sierra Nevada (Torrey, 428); Green Horn Mountains 6,000-7,000 ft. (Palmer, 99); Washington: Yakima Region (Tweedy).

✓Var. LINEARIFOLIUM (S. Wats.)

P. Bistorta, L., var. *linearifolium*, S. Wats. Bot. King's Exp. 317 (1871).

Nevada: E. Humboldt Mountains 9,500 ft. (Watson, 1069); Colorado: Pass Creek, Bridges Pass (Engelmann); Valley of the Lower Platte (Fremont).

Pursh in his Flora of North America published a *Polygonum bistortoides*, giving as its habitat the banks of the Missouri River. Later the plant was found throughout the west, though principally in the mountains. Very few authors accepted Pursh's opinion and name, and in subsequent publications the plant was referred to *P. Bistorta* of Europe. However, this disposal of the case is erroneous. Although the plant has the general appearance of the European species, it has enough constant characters to maintain it as a species as Pursh first ranked it.

Instead of the broadly ovate, cordate radical leaf of *P. Bistorta*, *P. bistortoides* has an oblong leaf, which is generally acuminate at the base. The achene instead of being oblong is narrowly obovoid with a narrower seed.

2. POLYGONUM VIVIPARUM, L. Sp. Pl. 360. (1753).

Iceland: (C. S. Smith); Greenland. Disco Island (Burk); Arctic America: (Parry, Richardson); Vermont: Mt. Mansfield (Pringle); New Hampshire: White Mountians, Alpine Garden (Schrenk), Great Haystack Mountain (Tuckerman); Colorado: Gray's Peak, 12,500 ft. (Letterman); Utah: Bear River Canon, 11,000 ft. (Watson); Oregon and Washington: (Wilkes U. S. Exp. 689); Alaska: St. Paul's Island (White); Juneau (Miss Cooley).

SECTION II.—PERSICARIA.

1. *Ocreæ setose or ciliate.*

3. POLYGONUM PERSICARIA, L. Sp. Pl. 361 (1753).

P. Valdivianum, Phil., according to specimen in Herb. J. Donnell Smith.

Introduced and naturalized in North and South America.

4. POLYGONUM RIVULARE, Phil. Linnæa, xxx. 199 (1859).

Chili: near Santiago, on the Mapocho River (according to Philippi).

This name is a homonym of *P. rivulare*, Roth, Nov. Pl. Sp. 206 (1821), and therefore if Philippi's species proves valid it will have to be changed.

5. POLYGONUM CAREYI, Olney in Proc. Prov. Franklin Soc., i. 29 (1847).

Maine: Orono (Fernald); Massachusetts: Amherst and Plainfield (Hitchcock); Rhode Island: Providence (Olney); New Jersey: Mickleton (Brinton); Pennsylvania: Pocono Mountain (Porter).

6. POLYGONUM PERSICARIOIDES, H.B.K. Nov. Gen. ii. 179 (1817).

South America: Argentine Rep. Mendoza (Gillies); Chili: Valparaiso (U. S. S. P. Ex. Exp)., Desert of Atacama (Morong, 1281); Peru: Lima (Wilkes' Exp.); Bolivia: Cochabamba, 7,000 feet (Bang, 1025); Mexico: Orizaba (Botteri, 584 and 254), San Luis Potosi (Schaffner, 883), Batopilas (Palmer, 137), Guaymas (Palmer, 211), Sonora (Thurber, 357); Texano-Mexican Boundary (Berlandier, 912 and 2342); Mexican Boundary Survey, 1183; New Mexico: San Pedro River (Wright, 1778); Texas: Dallas (Reverchon, 698). Reported from Austin County, Texas, by J. M. Holzinger (Bot. Gaz. xvii. 295).

7. POLYGONUM SEGETUM, H.B.K. Nov. Gen. ii. 177 (1817).

P. segetum, H.B.K., var. *genuinum*, Meisn. in D.C. Prodr. xiv. 121 (1856).

P. Ludovicianum, Meisn., in D.C. Prodr. xiv. 116 (1856).

Louisiana (Teinturier); Cuba (Ramon de la Sagra); South America: Columbia (Funcke and Schlim, 250).

To this species must be referred *P. Ludovicianum*. Meisner's argument for *P. Ludovicianum* will not stand proving, because his principal character breaks down on the type specimen. The plant is identical with *P. segetum*. The only distinctive character given is simply pubescent peduncles and pedicels in place of glandular ones. The diagnosis is incorrect, however, as some glands do exist on the original specimen.

8. POLYGONUM SETACEUM, Baldw. in Ell. Sketch, i. 455 (1817).

North Carolina (Curtis); Florida (Chapman); Louisiana: Feliciana (Carpenter, 1); Alexandria (Hale).

9. POLYGONUM HIRSUTUM, Walt. Fl. Carol. 132 (1788).

P. hirsutum, Walt., var. *dasyphyllum*, Meisn. in D.C. Prodr. xiv. 103 (1856).

Middle Florida (Chapman); Eastern Florida (Leavenworth); Mayport and Jacksonville (Keeler); Georgia to North Carolina (fide Meisner).

Var. GLABRESCENS, Meisn., in D.C. Prodr. xiv. 103 (1856).

Northern Florida at Lake Jacnony (Rugel, 86); lake near Tallahassee (Rugel).

10. POLYGONUUM OPELOUSANUM, Riddell, New Orleans Med. Surg. Journ. viii. 760 (1852), name only.

Plant apparently two to three feet tall, slender, erect and sparingly branched. Leaves narrowly linear-lanceolate to almost linear, two to four inches long, sessile, ciliate on the margins and both sides of the mid-rib, sheaths strigose and long-ciliate; spikes one to one and a half inches in length, rather loosely flowered; bracts densely bearded with bristles; flowers white; calyx five-parted; stamens eight (?); style three-parted, short; achene triquetrous, smooth.

Louisiana: Low prairies near Opelousas (Carpenter, 26).

The species here proposed is most closely related to *P. hydropiperoides*, from which it differs by its smaller size, more slender habit, and the conspicuously setose bracts.

11. POLYGONUM HYDROPIPEROIDES, Michx. Fl. Bor. Am. i. 239 (1803).

P. virgatum, C. and S. Linnæa, iii. 45 (1828).

P. mite, Pers. Syn. i. 440 (1805).

P. australe, Thieb. in Pers. Syn. i. 440 (1805).

Vermont, Charlotte (Pringle); Middlebury (Brainerd); Massachusetts: Essex Co. (Oakes); Rhode Island: Providence (Olney); New York: Bloomingdale (Torrey); Pennsylvania: Easton (Porter); Dauphin and Luzerne Cos. (Small); North Carolina (Hunter); Rowan Co. (Small and Heller); Florida: Mayport and Jacksonville (Keeler); Duval Co. (Curtiss, 2,402 and 2,411 distributed as *P. setaceum*, Baldwin); Lake Jacnony (Rugel, 85); Western Alabama (Rugel); Wilcox Co. (Buckley, 1); Mexico: Orizaba (Müller); Brazil: Serra de Argaos (Gardner, 599).

Var. STRIGOSUM, n. var.

One and a half to two feet tall. Stem clothed with stout, appressed hairs; leaves lanceolate to linear-lanceolate, obtuse, strigillose; sheaths averaging half an inch long, densely strigose and long-ciliate; bracts strigillose and ciliate; flowers whitish.

Indiana: Indianapolis, along the White River (Britton); West Virginia: Preston Co., along the Cheat River (J. D. Smith); Canada: Gatineau River (Macoun).

This well-marked variety we now have from three separate localities. Its almost white flowers, dense strigoseness and heavier habit separate it very clearly from the typical form.

12. POLYGONUM HYDROPIPER, L. Sp. Pl. 361 (1753).

P. Hydropiper, L., var. *vulgare*, Meisn., in D.C. Prodr. xiv. 109 (1856).

Canada to Florida, and westward across the continent. Said to be native northward. Clearly naturalized from Europe in the Eastern and Middle States.

13. POLYGONUM EPILOBIOIDES, Weddell, Ann. Sc. Nat. 3d ser. xiii. 254 (1849).

Brazil: Matto-Grosso, on the Cabacal (according to Weddell).

14. POLYGONUM PARAGUAYENSE, Weddell, Ann. Sc. Nat. 3d ser. xiii. 253 (1849).

Brazil: Matto-Grosso, on the Paraguay River (according to Meisner.)

In every case in which Meisner had occasion to refer to this species, he was inclined to be very skeptical about its validity. It is admitted here in the hope that some certain facts concerning it may be obtained. Dr. Morong did not meet with it in Paraguay.

15. POLYGONUM MINUS, Huds. Fl. Angl. 148 (1762).

Chili (Philippi).

16. POLYGONUM PUNCTATUM, Ell. Sketch, i. 455 (1817).

P. acre, H.B.K. Nov. Gen. ii. 179 (1817), not Lam.

P. hydropiperoides, Pursh, Fl. Amer. Sept. i. 270 (1814), not Michx.

P. hydropiper, Michx. Fl. Bor. Am. i. 238 (1803), not L.

P. acre, H.B.K., var. *confertiflorum*, Meisn. in D.C. Prodr. xiv. 108 (1856).

Common and variable throughout America.

Var. LEPTOSTACHYUM (Meisn.).

P. acre, H.B.K., var. *leptostachyum*, Meisn. in D.C. Prodr. xiv. 108 (1856).

Vermont: Clarendon (Brainerd); New Jersey: Cedar Swamp (Torrey); Pennsylvania: Easton (Porter); Perry Co. (Small); Virginia: Cumberland Gap (Small); Florida (Riehl, 311); Missouri: St. Louis (Engelmann); California: at the Geysers (Torrey); New Granada: La Paila (Holton, 274).

17. POLYGONUM ACUMINATUM, H.B.K., Nov. Gen. ii. 178 (1817).

P. cuspidatum, Willd., ex. Spreng. Syst. ii. 256 (1825).

P. erectum, Vell. Fl. Flum. iv. t. 42 ? (1827).

P. acuminatum, H.B.K., var. *Humboldtii*, Meisn. in Fl. Bras. v. 14, t. 4. f. i. (1855).

West Indies: Cuba (Wright, 2,245); Porto Rico (Sintenis, 1715 and Eggers); Guatemala (Bernoulli, 1065); Surinam (Hostman, 473); Brazil: Minas Geraes (Regnell, 234).

Var. BRACHYSTEMON, Meisn. in D.C. Prodr. xiv. 114 (1856).

Brazil: Pernambuco (Gardner, 1123); Surinam (Hostmann and Keppler, 473).

Var. MICROSTEMON, Meisn. in Mart. Fl. Bras. v. 14, t. 4, f. 2 (1855).

Brazil: Bahia (Martius); Paraguay: Pilcomayo River (Morong, 1060).

Var. WEDDELLII, Meisn. in D.C. Prodr. xiv. 114 (1856).

Southern Brazil, according to Meisner. Guatemala: Coban, 4,300 feet (Tuerkcheim, 517).

18. POLYGONUM HISPIDUM, H.B.K. Nov. Gen. ii. 178 (1817).

Cuba (Wright, 3669); New Granada: La Paila (Holton, 273); Brazil: Pernambuco (Gardner, 1122); Paraguay: Pilcomayo River (Morong, 1026).

2. *Ocreæ eciliate or sometimes slightly ciliolate.*

19. POLYGONUM PENNSYLVANICUM, L. Sp. Pl. 362 (1753).

Canada to Florida, westward to Minnesota and Texas.

20. POLYGONUM MEXICANUM, n. sp.

P. Pennsylvanicum, S. Watson, in Proc. Am. Acad. Arts and Sci. xviii. 147 (1883).

Plant erect, branched, apparently three to four feet high, smooth except the peduncles and pedicels, which are glandular;

leaves linear-lanceolate to narrowly linear, two to four and a half inches long, short-petioled, ciliate-margined, punctate; sheaths truncate, smooth, one inch long; flowers light rose-color, in dense spikes, which are one inch long and erect; calyx five-parted; stamens six to eight; style two-parted, long; achene lenticular, broadly ovate, long-pointed, reticulated and dull.

Mexico: Sonora (E. K. Smith), San Luis Potosi (Schaffner, 882), Jalisco (Pringle, 5186).

This species is most closely related to *P. Pennsylvanicum*, from which, however, it differs in a marked degree in its leaves and flowers, but especially in its broadly ovate and dull achene.

21. POLYGONUM PRINGLEI, n. sp.

Plant mostly erect, branching, two to five feet high, the lower part of the stem inclined to be decumbent and to root at the nodes, glandular throughout, peduncles and pedicels densely glandular. Leaves linear-lanceolate to linear, two to four inches long, subsessile, acuminate, ciliate-margined, minutely punctate; sheaths loose, slightly rough; flowers light pink, in rather loose, thick, cylindrical spikes, which are one inch long, or less, and erect; calyx 5-parted, stamens generally eight; style two or three-parted, rather short; achene lenticular or concave-triquetrous, broadly obovate, short-pointed, smooth and shining.

Mexico: San Luis Potosi, Las Canoas (Pringle, 5183).

This species collected by Mr. Pringle, is a beautiful and peculiar plant. Its stem is very glandular down to the root. The spikes are usually thick and the flowers of a light-rose color. As is the case in a number of other species, *P. Pringlei* has a two or three-parted style, and consequently lenticular and triquetrous achenia. In aspect this species is most nearly related to *P. lapathifolium*.

22. POLYGONUM LAPATHIFOLIUM, L. Sp. Pl. 360 (1753).

P. Pennsylvanicum, Curt. Fl. Lond. t. 73 (1777), not L.

P. nodosum, Pers. Syn. i. 440 (1805).

P. utriculatum, Remy in Gay, Fl. Chili, v. 267 (1849).

This species seems to be introduced throughout North America, Mexico and West Indies. It is remarkably variable. Extreme forms seem to furnish sufficient characters to hold *P. nodosum* separate from *P. lapathifolium*, but the close study of a large number of specimens seems to indicate that none of the characters maintain themselves.

23. POLYGONUM INCARNATUM, Ell. Sketch i. 456 (1817).

P. lapathifolium, L. var. *incarnatum*, S. Wats. in A. Gray, Man. Ed. 6, 440 (1890).

Vermont: Middlebury (Brainerd); New York: Coney Island (Britton); New Jersey: Lake Grinnell (Britton); Pennsylvania: Harrisburg (Small); Illinois: Rockford (Goddard); Kentucky: Lexington (Short); Florida (Chapman); Louisiana: Red River (Hale); Feliciana (Carpenter).

It is better and more consistent to hold *P. incarnatum* as a species than to reduce it to a variety of *P. lapathifolium*. It is a native of North America, and has a well marked and restricted range, whereas *P. lapathifolium* is most likely an introduced species, and has become of a much more cosmopolitan character.

24. POLYGONUM DENSIFLORUM, Meisn. in Mart. Fl. Bras. v, 13 (1855.)

P. acuminatum, Meisn. Mon. 78, in part (1826).

P. densiflorum, Meisn. var. *imberbe*, Meisn. in D.C. Prodr. xiv, 121 (1856).

P. glabrum, Authors, not Willd.

Florida (Chapman 91); Lake Monroe (Rugel, 199); Louisiana: Alexandria (Hale); New Orleans (Riddell; Ingalls); Martinique (Jardin, 302); British Guiana (Jenman, 1628).

Var. CILIOLATUM, Meisn. in D.C. Prodr. xiv. 121 (1856).

British Guiana: Lama (Jenman, 4697); Hooroobea (Jenman, 5114).

Polygonum glabrum, a species related to the foregoing has long been credited to America. This is due to the erroneous determination of certain forms of *P. densiflorum* and *P. lapathifolium*. *P. glabrum* is an East Indian species, and after a careful study and comparison of a large amount of American material with the true eastern *P. glabrum*, all the American specimens refered to *P. glabrum*, prove to be forms of *P. densiflorum* and *P. lapathifolium*.

25. POLYGONUM DIOSPYRIFOLIUM, C. and S. Linnæa, iii. 47 (1828).

Brazil: prov. Rio Janeiro and Minas (according to Meisner).

26. POLYGONUM PERUVIANUM, Meisn. in D.C. Prodr. xiv. 122 (1856).

Peru (Matthews, 3120, according to Meisner).

27. POLYGONUM FERRUGINEUM, Weddell, Ann. Sc. Nat. 3d ser. xiii. 252 (1849).

P. spectabile, Mart. ex Meisn. Fl. Bras. v. 13, t. 3 (1855).

P. gummiferum, Weddell, loc. cit. (1849)?

P. glabrum, C. and S. Linnæa, iii. 46 (1828)?.

Eastern Brazil: Pernambuco (Gardner, 1124), and Havana, Cuba (according to Meisner).

Var. INCANUM (Meisn.)

P. spectabile, Mart. var. *incanum*, Meisn., in Mart. Fl. Bras. v. 13 (1855).

Northern Brazil: Para (Spruce, 640).

28. POLYGONUM AMPHIBIUM, L. Sp. Pl. 361 (1753).

P. coccineum, Muhl. Cat. 40 (1813).

Ontario: Wingham (Morton); Quebec: Tadousac (Northrop); New Hampshire: Squam Lake (Schrenk); Mass.: Ipswich (Oakes); New York: Onondaga Lake (Underwood); Rockland Lake (Morong); Eagle Lake (Miss E. G. Knight); New Jersey: Morris Pond (Britton); Kentucky (Short); Rocky Mountains: Pass Creek to Bridges Pass (Englemann); Nevada: Ruby Valley (Watson); California: San Jacinto Mountains (Parish).

29. POLYGONUM EMERSUM (Michx.) Britton, Trans. N.Y. Acad. Sci. viii. 73 (1889).

P. amphibium, L. var. *emersum*, Michx. Fl. Bor. Am. I. 240 (1803).

P. amphibium, L. var. *Muhlenbergii*, Meisn. in D.C. Prodr. xiv. 116 (1856).

P. Muhlenbergii, S. Wats. Proc. Amer. Acad. xiv. 295 (1879).

New York: Yates County (Gray); Staten Island: Garretsons (Britton); New Jersey: Morris Co., Budd's Lake (Porter); Pennsylvania: Lehigh County (Moser); Luzerne County, Long Pond (Small and Heller); Dauphin County along Susquehanna river (Small); Virginia: Giles County (Britton); Michigan: Fort Gratiot (Pitcher); Minnesota: Fort Snelling (Mearns); Nebraska: Scott's Bluff County (Rydberg); Louisiana: Alexandria (Hale); Texas: Tom Greene County (Tweedy); New Mexico (Wright, 1779); Arizona: Mogollon Mountains (Mearns); Colorado: Uncompahgre Mountain (Flint); California: Sacramento Valley (U. S. S. Pac. Ex. Exp. 124), De Fuca (Scouler); Mexico: Near City of Mexico (Gregg, 126).

30. Polygonum Hartwrightii, A. Gray, Proc. Am. Acad. viii. 294 (1870).

New York: Yates County (Hart Wright), Erie County (Britton); New York County (Bicknell); New Jersey: Sussex County (Porter and Britton); Michigan: Keweenaw County (Farwell, 351), Fort Gratiot (Pitcher); Nebraska: Cherry County (Bates); Nevada: Lake Washoe (Torrey, 427); Oregon: Nasqually (U. S. S. Pac. Ex. Exp. 124).

SECTION III.—AMBLYGONON.

31. Polygonum orientale, L. Sp. Pl. 362 (1753).

Introduced into waste grounds from India in many localities throughout the United States.

SECTION IV.—ACONOGONON.

32. Polygonum alpinum, All. Fl. Pedem. ii. 206, t. 68 f. i. (1785).

P. polymorphum, Ledeb. var *alpinum*, Ledeb. Fl. Ross. iii. 524 (1849).

Nevada: East Humboldt Mountains, 8,000 ft. (Watson, 1071).

Var. foliosum (Keller).

P. polymorphum, Ledeb. var. *foliosum*, Keller, Bull. Soc. Bot. Belg. xxx. 49 (1891).

Washington: Mount Adams (Howell); Mount Paddo (Adams) 6,000-7,000 ft. (Suksdorf).

Var. lapathifolium, C. and S. Linnæa, iii. 38 (1828).

P. polymorphum, Ledeb. var. *lapathifolium*, Ledeb. Fl Ross. iii. 525 (1849).

Alaska: Kuskokoin Valley (Weinmann), St. Michaels (Muir, 180), Cape Blossom (McLenigan), Kotzebue Sound (Beechey), Youkon River (Dall).

33. Polygonum phytolaccæfolium, Meisn. n. sp.

Plant erect, sparingly branched, smooth. Leaves ovate to ovate-lanceolate, obtuse or slightly cordate at base, acute at the apex, petioled, two to six inches long, ciliate-margined; sheaths semicylindrical, slightly pubescent, long; inflorescence paniculately racemose; flowers in rather loose, lax spikes which are about one inch long; calyx five-parted; stamens eight; style three-parted, very short; achene triquetrous, oblong, chestnut-brown, smooth.

California: (Cuming 229, type; Bridges 290), Donner Pass (Torrey 425); Coast of Mantchuria (Wilford).

The species here proposed has been confounded with *P. alpinum*, to which it is related but is plainly distinct. In 1867 it was sent to Meisner by Lenormand. Meisner saw directly that it was distinct from related species and left the following record on the label "*Polygonum phytolaceæfolium* nob. (25./6/67)" but so far as I can find he never published it, as was the case with a number of his other manuscript names.

34. POLYGONUM DAVISIÆ, Brewer, in A. Gray, Proc. Am. Acad. viii. 399 (1872).

California; Alameda Country (Miss Davis), Hermit Valley (Brewer, 2105), Placer County, on Truckee River (Sonne); Washington: Yakima Region, 6,000 ft. (Tweedy), Mt. Hood, 6,000-8,000 ft. (Howell).

The type of this peculiar and interesting *Polygonum* is glabrous, but densely tomentose specimens have been collected on some of the higher mountains along the Pacific coast. If sufficient material can be secured which will exhibit enough and constant characters there may be reason for describing these as a variety of the above species.

SECTION V.—AVICULARIA.

1. *Plants prostrate.*

35. POLYGONUM AVICULARE, L. Sp. Pl. 362 (1753).

Thoughout North America and at various localities in Mexico and South America.

36. POLYGONUM LITTORALE, Link, in Schrad. Journ. i. 54 (1799).

P. salsuginosum, Wallr. Linnæa, xiv. 568 (1840).

P. aviculare, l., var. *littorale*, Mert. & Koch, in D. Fl. iii. 59 1831).

P. crassinerve, Cesati, Stirp. Ital. fas. ii. (1840).

Canada: shore of Thunder Bay (Britton); Pennsylvania: Lycoming Co. (Small & Heller); Illinois: Sandy Plains (Short); Missouri: St. Louis Co. (Engelmann).

Var. BUXIFOLIUM, (Nutt.), Meisn. in D.C. Prodr. xiv. 98 (1856).

P. aviculare, L., var. *buxifolium*, Ledeb. Fl. Ross. iii. 532 (1847-49).

P. buxifolium, Nutt. in Bongard, Veg. Ins. Sitcha, 161 (1831).

P. aviculare, L., var. *latifolium*, Michx. Fl. Bor. Am. i. 237 (1803), fide Bongard.

Island of Sitcha.

37. POLYGONUM BELLARDI, All. Fl. Pedem. ii. 205, t. 90, f. 2 (1785).

Introduced into the agricultural grounds at Washington, D. C. (Vasey).

38. POLYGONUM MARITIMUM, L. Sp. Pl. 361 (1753).

P. glaucum, Nutt. Gen. i. 254 (1818).

Along the sea coast of Eastern North America. Maine: Mt. Desert (Miss Knight); Massachusetts: Nantucket (Mrs. Hubert), Martha's Vineyard (C. C. Curtiss), Bristol Co. (T. A. Greene); New York: Long Island (Torrey), Hog Island (E. H. Day); New Jersey: (A. Gray), Anglesea and Atlantic City (Brinton); Maryland; Worcester Co. (Rusby); Southern Florida: (Chapman).

39. POLYGONUM RAYI, Babingt. Man. Brit. Bot. 2nd ed. 275.

Naturalized on the Atlantic coast. New York: on Harlem River (Bicknell); Virginia: Portsmouth (Rugel); Norfolk (Britton).

This species of *Polygonum* has long been in the country, naturalized at the above cited localities. It was first collected at Portsmouth, Va., by Rugel. This specimen was deposited in the Herbarium of the British Museum. Later it was transferred to the Herbarium of the Geological and Natural History Survey of Canada, whence it found its way to the Columbia College Herbarium.

40. POLYGONUM LACERUM, H.B.K. Nov. Gen. ii. 179 (1817).

Mountains of Peru (according to Humboldt); Bolivia: La Paz, 10,000 ft. (Bang, 130), Cochabamba, 7,000 ft. (Bang, 1057); Western Texas: Maronllas Creek (Havard, 112).

According to a note in DeCandolle's Prodromus, Meisner seems to doubt the validity of this species, saying that fragments of Humboldt's specimens in Kunth's Herbarium are hardly sufficient to distinguish it from related plants. A very short and indefinite description is given, but the specimens of Mr. Bang agree reasonably well with it and are from the same region in which *P. lacerum* is said to occur.

As I have not seen Humboldt's specimen, I prefer to refer Mr. Bang's to *P. lacerum* rather than to describe them as new. In Dr. Rusby's distribution of Mr. Bang's collections this plant was referred to *P. striatum* which proves to be incorrect. Havard's 112 from Western Texas belongs here, and interesting as this may be, it is not surprising, for, as the flora of the Andes of South America is gradually brought to light, the relation between it and that of the southwestern United States is more clearly seen

41. POLYGONUM CHILENSE, C. Koch, Linnæa, xxii. 206 (1849).

P. maritimum, C. and S. Linnæa, iii. 51 (1828), not L.

P. Sanguinaria, Remy, in Gay Fl. de Chili, v. 270 (1876).

Southern South America: Coast of Chili and Strait of Magellan: Sandy Point (Lechler, 1128).

42. POLYGONUM BOWENCAMPI, Phil. Linnæa, xxxiii. 224 (1864).

Chili: Santiago, in the Andes (Bowencamp, according to Philippi).

43. POLYGONUM STRIATUM, C. Koch, Linnæa, xxii. 206 (1849).

P. maritimum, Remy, in Gay Fl. de Chili, v. 269 (1845), not L.

South America.—Chili: Corral, Province of Valdivia (Lechler, 712); Ancud (Philippi).

44. POLYGONUM SHASTENSE, Brewer, in A. Gray, Proc. Am. Acad. viii. 400 (1872).

In the Sierra Nevada Mountains, California: Mt. Shasta, 8,000-9,000 feet (Brewer, 1382); Lassens Peak, 9,000-10,000 feet Brewer, 2179); near Donner Pass (Torrey, 424).)

45. POLYGONUM PARONYCHIA, C. and S. Linnæa, iii. 51 (1828).

Puget Sound and San Francisco (U. S. S. Pac. Expl. Ex., 1454); California (Eschscholtz); Monterey (Rich); San Francisco (Torrey, 429); Oregon (Pringle); British Columbia: Vancouver Island (Macoun).

46. POLYGONUM FLAGELLIFORME, Weddell, in Ann. Sc. Nat. 3d ser. xiii. 254 (1849).
Southern Brazil: Province of Rio Grande.

2. *Plants erect.*

47. POLYGONUM ERECTUM, L. Sp. Pl. 363 (1753).
Massachusetts: Cambridge (Morong); South Boston (Faxon); New York: Staten Island (Britton); Pennsylvania: Lancaster Co. (Porter), Lycoming Co. (Small and Heller); Virginia: Norfolk (Morong); Smyth and Pulaski Cos. (Small); Tennessee: Cumberland Gap (Small); Southern States (Chapman); Illinois: Oquawka (Patterson); Nevada: Austin, 6,500 feet (Watson, 1056).

48. POLYGONUM RAMOSISSIMUM, Michx. Fl. Bor. Am. i. 237 (1803).
Massachusetts: Milton (Deane); New York: Staten Island (Britton); along Harlem River (Bicknell); New Jersey: Atlantic City (Brinton); Nebraska: Valentine (Bates); Long Pine (Conkling); Minnesota: Fort Snelling (Mearns, 583); Indian Territory (Palmer, 287); New Mexico (Wright, 1775); Utah: Salt Lake City, 4,300 feet (Jones, 1090); Wyoming: Yellowstone Park (C. H. Hall); Nevada: Truckee Valley (Bailey, 1057); Saskatchawan (Bourgeau).

49. POLYGONUM BERTEROI, Phil. Linnæa, xxix. 38 (1857).
Chili: Near Rancagua (Bertero, according to Philippi).

50. POLYGONUM BRASILIENSE, C. Koch, Linnæa, xxii. 206 (1849).
P. aviculare, L., var. *Montevidense*, C. and S. Linnæa, iii. 50 (1828).
Southern South, America.

Not having seen this species, I prefer for the present to retain *Brasiliense* as the specific name, which, however, should be changed, if *P. Brasiliense* and *P. aviculare*, var. *Montevidense* are identical.

51. POLYGONUM CAMPORUM, Meisn. in Mart. Fl. Bras. v. 21 (1855).

P. camporum, Meisn., var. *boreale*, Meisn., in Mart. Fl. Bras. v. 22 (1855).

Texas (Drummond, 254); on the Sea Willow (Bigelow, Mex. Bound. Surv.); Maverlick Co., mouth of the Las Moras (Schott); Bejar (Berlandier, 1770); Western Texas (Wright, 614); Nebraska: Lancaster Co. (Webber).

Var. AUSTRALE, Meisn. in Mart. Fl. Bras. v. 22 (1855).

In Buenos Aires (according to Meisner).

52. POLYGONUM STYPTICUM, C. and S. Linnæa, iii. 53 (1828).

Southern Brazil: On the Rio Negro (Sellow); Northern Patagonia: Rio Negro (Wilkes S. Pacific Expl. Ex.).

53. POLYGONUM TENUE, Michx. Fl. Bor. Am. i. 238 (1803).

P. linifolium, Muhl. Cat. 40 (1813).

New Hampshire: Red Hill (Schrenk); Connecticut: New Haven Co. (Eaton); Pennsylvania: Lehigh Co. (Moser); Delaware Co. (Brinton); Montour Co. (Heller); Lancaster and Lebanon Cos. (Small); Maryland: Worcester Co. (Rusby); North Carolina: Smith Mountain (Miss Reynolds); Michigan: St. Clair Co. (Pitcher); Iowa: Winneshiek Co. (Holway); Illinois: Henderson Co. (Patterson); Kentucky (Short); Arkansas (Leavenworth); Red River (Pitcher).

54. POLYGONUM DOUGLASII, Greene, in Bull. Cal Acad. i. 125 (1885).

P. coarctatum, Dougl., var. *majus*, Meisn. in D.C., Prodr. xiv. 101 (1856) in part.

Canada: Lake Muskoka (Britton); Vermont: Snake Mountain (Brainerd); Nebraska: Banner Co. (Rydberg, 346); Indian Territory: On the False Washita (Palmer, 288); New Mexico: Copper Mines (Bigelow); Colorado: Eagle River (Coulter); Utah: Wahsatch Mountains, 7,000 feet (Watson, 1059); Nevada: Austin, 6,500 feet (Watson, 1059); Washoe Valley (Stretch, 182); California: Yosemite Valley and Mountains (Torrey, 423); Oregon (Hall, 450); on the Columbia River (Douglas); Washington: Falcon Valley (Suksdorf, 211); Vancouver Island: Departure Bay (Macoun).

For some years there has been dissatisfaction among certain botanists as to the disposal of a *Polygonum*, found in the north-eastern United States and Canada, which resembles *P. tenue* to some extent. The whole trouble proves to be caused by trying to make two separate and distinct species one. The plant turns out to be *P. Douglassii*, which ranges across the northern part of the continent from the Pacific to the Atlantic Ocean. *P. Douglassii* can be distinguished from its relative *P. tenue* at a glance, and is beautifully distinct, as Prof. Greene has pointed out, by its one-ribbed leaf in place of the three-ribbed leaf of *P. tenue*, and the much longer, narrower and pediceled, drooping fruit, instead of the short, thick, sessile, erect fruit of that plant.

Var. LATIFOLIUM (Engelm.) Greene, Bull. Cal. Acad. i. 125 (1885).

P. tenue, Michx. var. *latifolium*, Engelm., in A. Gray, Proc. Phila. Acad. 1863, 75.

Colorado: Gray's Peak (Patterson. 130); Arizona: Mokiah Pass (Palmer, 420); California: Tulare Co. (Palmer, 177); Oregon: Siskiyou Mountains (Howell).

55. POLYGONUM MICROSPERMUM (Engelm).

P. tenue, Michx. var. *microspermum*, Engelm., in A. Gray, Proc. Phila. Acad. 1863, 75.

P. Engelmanni, Greene, Bull. Cal. Acad. i. 126 (1885).

Colorado: Jefferson Co., Bergen Park (Greene).

56. POLYGONUM AUSTINÆ, Greene, Bull. Cal. Acad. i. 212 (1885).

California: Modoc Co. (Mrs. Austin); Wyoming, Yellowstone Park (Tweedy).

57. POLYGONUM SPERGULARIÆFORME, Meisn.

P. coarctatum, Dougl. ex. Meisn. in D.C. Prodr. xiv. 101 (1856), not Meisn.

Western North America: Straight of De Fuca (Scouler), California (Fremont), Borax Lake (Torrey, 426); Oregon and Northern California (U. S. S. Pac. Exploring Expedition, 1628).

The specific name *coarctatum* was first published in Meisner's Mon. Gen. Polyg., in 1826, being there applied to a Siberian plant. The name, therefore, cannot be used for the American species. Meisner left the manuscript name *spergulariæforme* on one of his labels, which is here taken up.

58. POLYGONUM MINIMUM, S. Watson, Bot. King, Exp. 315 (1871).

P. Torreyi, S. Watson, Am. Naturalist, vii. 664 (1873).

Utah, near River Canon, 10,500 feet (Watson, 1058), Wahsatch Mountains, 8,000 feet (Jones, (1221); Idaho (Kootani Co. (Heller), Washington, Yakina region (Tweedy).

59. POLYGONUM KELLOGGII, Greene, Fl. Fran. 134 (1891).

California: Mountains near Donner Lake (according to Greene).

60. POLYGONUM INTERMEDIUM, Nutt. in S. Watson, Proc. Am. Acad. xvii. 378 (1882).

Oregon: Bridal Veil, Multnomah Co. (Suksdorf); Bluffs of the Columbia River (Pringle); Cape Horne (Howell); Vancouver Island (Macoun).

61. POLYGONUM IMBRICATUM, Nutt. in S. Watson, Am. Nat. vii. 665 (1873).

California: Donner Lake (Torrey, 426 a), Green Horn mountains, Kern Co. (Palmer, 64); Washington: Falcon Valley and Skamania Co. (Suksdorf), Yellowstone Park, Mt. Evarts, 8,000 feet (Tweedy); Utah: Alta Wahsatch Mountains, 10,000 feet (Jones, 1105), Parley's Park, 6,500 feet (Watson, 1062 and 1063); Nevada: East Humboldt mountains, 9,500 feet (Watson, 1062 and 1063).

62. POLYGONUM POLYGALOIDES, Meisn. in D.C., Prodr. xiv. 101 (1856).

Oregon and Washington (U. S. S. Pac. Ex. Expedition, 533 bis), also on the Koorkoorhea river: Spokane Co. (Susksdorf); Montana; Beaver Head Co. (Tweedy, 104).

63. POLYGONUM BOLANDERI, Brewer, in A. Gray, Proc. Am. Acad. viii. 400 (1872).

California: Napa Valley (Bolander, 18; Brewer, 854, Pringle), and in the Valley of the Sacramento.

SECTION VI. DURAVIA.

64. POLYGONUM CALIFORNICUM, Meisn. in D.C. Prodr. xiv. 100 (1856).

California (Hartweg, 1944), Sacramento river (Nevius), Donner Lake, 7,500 feet (Greene 439), Milton (Parry 247), Napa (Bolander, 2643); Oregon: Grant's Pass (Howell).

65. POLYGONUM GREENEI, S. Watson, Proc. Am. Acad. xvi. 295 (1879).

California: Calistoga (Greene), Shasta Co., Redding (Greene).

66. POLYGONUM BIDWELLIÆ, S. Watson, Proc. Am. Acad. xiv. 294 (1879).

California: near Chico (Mrs. Bidwell).

67. POLYGONUM PARRYI, Greene, Bull. Torr. Club, viii. 99 (1881).

Oregon: Waldo (Howell), Grant's Pass (Howell, 254); California: Yosemite Valley (Parry); Washington: Falcon Valley (Suksdorf, 609).

SECTION VII. TINIARIA.

68. POLYGONUM CONVOLVULUS, L. Sp. Pl. 364 (1753).

Vermont: Charlotte (Pringle); Maine: Mt. Desert Island (White); New York: Alder Lake, (Rusby); Pennsylvania: Bucks County (Ruth); Virginia: Natural Bridge (Britton), White Rock mountain and Cumberland Gap (Small); Florida (Chapman); West Virginia: Banks of the Ohio (Millspaugh); Nebraska: Fort Niobrara (Wilcox), Kimball County (Rydberg, 350); Utah: Utah Valley, 5,000 feet (Watson, 1070).

69. POLYGONUM DUMETORUM, L. Sp. Pl. Ed. 2, 522 (1762).

There are specimens of this species identical with the European plant, in the Harvard and Columbia College Herbaria, collected by Englemann on the prairies of Illinois and about St. Louis, Missouri. Whether the plant is introduced from Europe or native, it is impossible to tell at the present time.

70. POLYGONUM SCANDENS, L. Sp. Pl. 364 (1753).

P. dumetorum, L. var. *scandens*, A. Gray, Man. Ed. 5, 41 (1867).

Massachusetts: Ipswich (Morong); New York: Erwin (Hart Wright), New York City (Torrey), Staten Island (Britton); Pennsylvania: Bethlehem (Moser), Harrisburg (Small); Florida (Chapman); West Virginia: Monongalia County (Millspaugh); Louisiana: New Orleans (Ingalls); Indian Territory, on the False Washita (Palmer, 289); Texas, on the Liana (Lindheimer, 685); Nebraska: Lincoln (Webber), Deuel County (Rydberg, 351).

Although this species closely resembles *P. dumetorum* in aspect, it has characters which are constant and sufficient to hold it separate from that plant. The achene is much larger, the wings of the calyx much broader and more emarginate at the apex; the pedicels are also longer than in *P. dumetorum.*

71. POLYGONUM CRISTATUM, Engelm and Gray, Pl. Lindh. Boston Journ. Nat. Hist. v. 259 (1847).

Texas (Lindheimer, 296); South Carolina: Santee Canal (Ravenel).

The range of this species of which so little is known, has been extended far to the east by specimens of Ravenel, collected on the Santee Canal, S. C., which have been preserved for many years in the Gray Herbarium, under the name of *P. scandens.* There may be much more of it scattered through the South, and probably it has been overlooked on account of its close relationship to that species.

72. POLYGONUM CILINODE, Michx. Fl. Bor. Am. i. 241 (1803).

Canada, North Bay (Britton); Wisconsin: Milton (Sandberg); Massachusetts: Williamstown (Torrey); New York: Alder Lake (Rusby), Onteora Mountains (Miss Vail); Pennsylvania: Pocono Mountains (Wolle), Perry and York Counties (Small).

73. POLYGONUM CUSPIDATUM, Sieb. and Zucc. Fl. Japon. Fam. Nat. ii. 84 (1846).

Naturalized near Philadelphia, Pennsylvania (C. E. Smith); also on the banks of the Mohawk River below the Aqueduct, Schnectady N. Y. (Wibbe).

SECTION VIII.—ECHINOCAULON.

74. POLYGONUM SAGITTATUM, L. Sp. Pl. 363 (1753)

Massachusetts: Ipswich (Morong); New York: West Point Torrey); Minnesota: Hennepin Co. (Sandberg); Ohio: Canton (Riehl); Nebraska: Long Pine (Swezey, 113); Pennsylvania: Harrisburg (Small), Easton (Porter); Virginia: Iron Mountains (Small); West Virginia: Monongalia Co. (Millspaugh, 793); Florida: (Chapman).

Var. PUBESCENS, Keller, Bull. Soc. Bot. Belg. xxx. 45 (1891).

New York, wet grounds near Troy (A. Puissant according to Keller.)

75. POLYGONUM MEISNERIANUM, C. &. S., Linnæa, iii. 40 (1828).

P. Chamissoanum, Weddell, in Ann. Sc. Nat. 3d ser. xiii. 254 (1849).

Brazil: Caldas (Regnell, ii. 233).

Var. BEYRICHIANUM (C & S.) Meisn., in Mart. Fl. Bras. v. 19, t. 1, f. 2 (1855).

P. Beyrichianum, C. & S. Linnæa, iii. 42 (1828).

P. multangulare, Hook. & Arn. in Comp. Bot. Mag. ii. 62 (1836).

P. Türckheimii, Vatke., in Herb. of J. Donnell Smith.

Southern Brazil: Soracoba (Warming, 142), Caldas (Regnell, iii. 1027); Guatemala: Coban (Türckheim, 243); Cuba: (Wright, 2254); United States: Louisiana, Madisonville (Riddell), Bookfalaya River (Langlois).

76. POLYGONUM RUBRICAULE, Cham. Linnæa, viii. 130 (1833).

Brazil: (Sellow) according to Chamisso.

77. POLYGONUM STELLIGERUM, Cham. Linnæa, viii. 131 (1833).

Brazil: (Sellow) according to Chamisso.

78. POLYGONUM ARIFOLIUM, L. Sp. Pl. 364 (1753).

Massachusetts: Hingham (Morong); Vermont: Bristol (Pringle); New York: (Torrey); New Jersey: (Eaton); Pennsylvania: Harrisburg (Small); Delaware: Centreville (Commons); Southern States (Chapman).

SECTION IX.—TOVARIA.

79. POLYGONUM VIRGINIANUM, L. Sp. Pl. 360 (1753).

P. muticum, Moench. Suppl. 266 (1802).

Persicaria Virginiana, Gærtn. Fruct. et Sem. ii. 180, t. 119 (1802).

New York: Bloomingdale (Torrey); Pennsylvania: Easton (Porter); South Carolina: Bluffton (Mellichamp); Georgia: (Chapman); Kentucky: (Short); Missouri: St. Louis (Fritchey); Nebraska: Lincoln (Webber); Indian Territory: on the False Washita (Palmer); Red River (Pitcher).

Polygonum fimbriatum, Elliott is excluded from this list as its distinctive characters seem to be sufficient for holding it in the genus founded for it by Dr. Gray, namely *Thysanella.*

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XXII.

(Continued from page 266.)

HIERACIUM MAPIRENSE, spec. nov. Caule gracile, erecto, parce ramoso, pubescens, 30-40 cm. alto, superne nudo. Foliis oblongis vel lanceolatis, obtusis, denticulatis vel summis linearibus, integris, supra glabris, subtus parce pubescentibus, radicalibus petiolatis, 6-10 cm. longis, 1 cm. latis; capitulis paucis, gracile, pedunculatis, 3-4 cm. latis; involucro campanulato, bracteis lineari-lanceolatis, acutis, pubescentibus; radiis apice dentatis, disco duplo superantibus; pappus sordidus, glaber, 8 mm. longis.

Mapiri, 10,000 ft. (1694).

HIERACIUM ADENOCEPHALUM (Sch. Bip.). (*Pilosella adenocephala*, Sch. Bip. Bull. Soc. Bot. Fr. xii. 82, name only.) Near La Paz, 10,000 ft. (1653). The same as Mandon's 272.

Hypochæris elata (Wedd.), Griseb. Symb. Fl. Argent. 218. Near La Paz, 10,000 ft. (1723). The same as Mandon's 285.

HYPOCHÆRIS TARAXICOIDES (Walp.). (*Achyrophorus taraxicoides*, Walp. Rep. vi. 336.) Unduavi, 10,000 ft. (2134). The same as Mandon's 275.=*A. stenocephalus*, A. Gray.

HYPOCHÆRIS ACAULIS (Remy). (*Achyrophorus acaulis*, Remy in Gay, Fl. Chil. iii. 448.) Near La Paz, 12,000 ft. (1716).

HYPOCHÆRIS CHILENSIS (Sch. Bip.). (*Achyrophorus Chilensis*, Sch. Bip. Bull. Soc. Bot. Fr. xii. 82, name only.) Near La Paz, 10,000 ft. (1724). The same as Mandon's 284.

Sonchus asper (L.), Vill. Fl. Delph. iii. 158. Near La Paz, 10,000 ft. (1655).

CAMPANULACEÆ.

Centropogon Surinamense (L.) Presl. Prodr. Mon. Lobel. 48. Mapiri, 5,000 ft. (635); Unduavi, 8,000 ft. (637); Yungas, 4,000 ft. (1093).

CENTROPOGON YUNGASENSE, sp. nov. Herbaceum, ramis teretibus, glabris, divaricatis; foliis oblongis, obtusis, brevissime petiolatis, crenulatis, utrinque glabris, 6-7 cm. longis, 3-4 cm. latis; floribus terminalibus breviter racemosis 3 cm. longis; pedicelli graciles, canescentes, ebracteati, 1-2 cm. longi; calycis tubus brevis, puberulus, basi truncatus, lobis lineari-oblongis, basi patentibus; corollæ extus tomentulosæ; stigma inclusum.

Yungas, 4,000 ft. (642).

Siphocampylus augustiflorus, Schlecht. Unduavi, 12,000 ft. (653); Yungas, 4,000 ft. (646); locality uncertain (2550). The same as Lechler's 2,649, Herb. Kew. Mandon's No. 499 may be the same.

Siphocampylus Bolivianus, Zahlbr. Ann. k. k. Hof-Museum, vi. 443. Sorata, 8,000 ft. (645).

Apparently the same as Mandon's 496, the type of Dr. Zahlbrucker's species. Our specimens are stouter and with broader and thinner leaves than Mandon's. The plant was also collected by Pearce, somewhere in Bolivia, and his specimens are in the Kew Herbarium, under No. 712.

Siphocampylus Orbignyanus, A. DC. Prodr. vii. 405. Unduavi, 12,000 ft. (652).

Siphocampylus volubilis (H. B. K.) Don, Gen. Syst. Gard. iii. 703. Sorata, 8,000 ft. (650); Guanai, 2,000 ft. (643).

SIPHOCAMPYLUS MEMBRANACEUS, n. sp. Caule gracile, volubile, parce pubescente, 1-2 m. alto. Foliis oblongis, viridis, tenuibus, acuminatis, basi attenuatis, margine glanduloso-denticulatis, breviter petiolatis, supra glabris, subter minutissime puberulis, 10-15 cm. longis, 4-5 cm. latis; floribus paucis; pedicellis gracilibus, puberulis, 4-5 cm. longis; calycis tubus campanulatus 2 mm. longus, lobis subulato-linearibus, 1 cm. longis; corolla glabra, angusta, rubra, 4-5 cm. longa, lobis lanceolatis, acuminatis.

Yungas, 6,000 ft. (651).

SIPHOCAMPYLUS RUSBYANUS, n. sp. Caule ramisque glabris, teretibus. Foliis ovatis coriaceis, apice acutis, basi rotundatis vel subcordatis margine denticulatis, supra glabris, rugosis, subter valde reticulatis canescentibus, 6-10 cm. longis, 3-5 cm. latis; petiolis 5-15 mm. longis; pedicellis puberulis, 4 5 cm. longis; calycis tubo obconico 1 cm. alto, lobis lanceolato-linearibus, acutiusculis, 1 cm. longis, 1 mm. latis; corolla puberula, 2 cm. longa, 1 cm. diametro, valde lobata; antheræ omnes glabræ.

Mapiri, 5,000 ft. (644). Collected also by Pearce at Callcan, Nov. 1864.

SIPHOCAMPYLUS UNDUAVENSIS, n. sp. Dense stellato-pubescens. Foliis oblongo-lanceolatis, apice acuminatis, basid augustis, breve petiolatis, minute glanduloso-denticulatis 10-15 cm. longis, 2-4 cm. longis, subter reticulatis; pedunculis 3-5 cm. longis; calycis tubo subgloboso vel ovoideo, 1 cm. lato, lobis lanceolatis acuminatis, 5-7 mm. longis; corolla superne ampliata, puberula, 2-3 cm. longa, 1-1.5 cm. lata; antheræ apice hirtellæ; fructus subglobosus, 1-5 cm. diametro, dense stellato-pubescens.

Unduavi, 8,000 ft. (649).

SIPHOCAMPYLUS INCANUS, n. sp. Caule ramisque dense floccoso-incanis. Foliis late oblongis vel oblanceolatis apice abrupte acuminatis, basi attenuatis vel cuneatis, margine glanduloso-denticulatis, supra floccosis, subtus dense albo-incanis, 18-30 cm. longis, 7-10 cm. latis; petiolis 2-3 cm. longis; pedunculis crassis, floccosis, erectis, 10-15 cm. longis; calycis tubo oblongo-obovoideo, 1-2 cm. longo, incano, lobis lineari-lanceolatis, acuminatis, incanis, 3-4 cm. longis, 2-4 mm. latis; corolla dense floccosa, 4-5 cm. longa, 2 cm. lata, lobis oblique lanceolatis, acuminatis; antheræ dense hirsutæ.

Yungas, 6,000 ft. (648). Near *S. lanatus*, Benth.

SIPHOCAMPYLUS GLORIOSUS, n. sp. Ramis, petiolis, pedunculisque dense stellato-tomentosis. Foliis oblongis, apice acutis vel acuminatis, basi rotundis, margine glanduloso denticulatis, supra scabris rugulosis, subter reticulatis, stellato-tomentosis, 10-15 cm. longis, 4-6 cm. latis; petiolis crassis, 5-10 mm. longis; pedunculis crassis, folia æquantibus; calycis tubo late ovoideo, costato, 1.5 cm. longo, dense stellato, basi truncato, lobis foliaceis, late lanceolatis, reflexis, acuminatis, glanduloso-dentatis; corolla 4-5 cm. longa, superne ampliata, stellato-pubescens, lobis lanceolatis; antheræ dense hirsutæ.

Unduavi, 10,000 ft. (647). Near *S. giganteus.*

Siphocampylus giganteus (Cav.), Don., var. LATIFOLIUS, n. var. Foliis oblongis, acutis, 5.6 cm. latis. Unduavi, 8000 ft. (638).

SIPHOCAMPYLUS ANDINUS, n. sp. Glabrescens vel superne minutissime puberula, ramis gracilibus. Foliis lanceolatis utrinque viridis, acuminatis vel acutis, basid rotundatis, margine remote denticulatis, 5-8 cm. longis, 1-2 cm. latis; petiolis gracilibus, 5-1.2 cm. longis; pedunculis folium æquantibus; calycis tubo depresso-hemispherico, 2-3 mm. alto, 1 cm. lato, lobis foliaceis lanceolatis, acutis, erectis, integris, 1 cm. longis; corolla glabra, angusta, 4-5 cm. longa; antheræ apice pilosæ.

Unduavi, 8,000 ft. (641).

Resembles Mandon's No. 498; but leaves and calyx-teeth shorter, flowers larger and venation different.

SIPHOCAMPYLUS GRACILIS, n. sp. Molliter pubescens, caulis erectis, gracilibus, ½-1 m. altis. Foliis ovatis, acuminatis, basis truncatis vel subcordatis, margine irregulariter dentatis, utrinque pubescentibus, breviter petiolatis, 4-5 cm. longis, 2-4 cm. latis; flores in axillis summis; pedicellis gracilibus glabris 4-5 cm. longis; calycis tubo hemispherico, puberulo, 2-3 mm. alto, 4-5 mm. lato, lobis lanceolatis, acuminatis, integris 2 mm. longis; corolla glabra, angusta, 4 cm. longa, 5 mm. diametro, lobis angustis; antheræ glabræ.

Unduavi, 12,000 ft. (640.) Collected also by Bridges in Bolivia.

Var. GLABRIS, n. var. Tota planta glabra; foliis glanduloso-denticulatis.

Unduavi, 12,000 ft. (639). This was distributed as *Scorymbiferus*, Pohl, a Brazilian species which it resembles

Siphocampylus tupæformis, Zahlbr. Ann. k. k. Hof. Mus. vi. 440. Unduavi, 8000 ft. (636). Distributed as *Tupa Feuillei*, Don.

Tupa salicifolia, Don, Gard. Dict. iii. 700. Valparaiso, Chili (634).

Lobelia micrantha, H. B. K. Nov. Gen. iii. 316. Mapiri, 5,000 ft. (1967).

Lobelia nana, H. B. K. Nov. Gen. iii. 317, t. 272. Sorata, 10,000 ft. (1075). The same as Mandon's 1463.

Rhizocephalum pumilum, Wedd. Chlor. And. ii. 13. Unduavi, 8,000 ft. (2,445). The same as Mandon's 492.

Wahlenbergia linarioides (Lam.) A. D. C. Mon. Camp. 158. Near Valparaiso, Chili (632); Yungas, 6,000 ft. (631); Sorata, 10,000 ft. (633). Same as Mandon's 1664.

Phænological Notes.

By L. H. Pammel.

A paper read before the Iowa Academy of Science, December, 1891.

One of the points too often neglected in working up our flora is the relation that climate bears to plants. It is a question, too, that is of interest to horticulturists and agriculturists. Especially so when we take into consideration our cultivated plants. Few authors in working out our floras have touched upon this matter. Mr. Frederick Brendel[1] is one of the few who has given dates and time of ripening of seed of cultivated plants, as well as other phænological notes. Among the authors of our local floras who have given such data, I may mention W. R. Dudley,[2] Lester F. Ward,[2a] Britton,[3] Trelease,[4] Henry,[5] Halsted[6].

European investigators have been much more active in this direction. Extensive monographs and papers have been published by Fritsch,[7] Quetelet,[8] Lachmann,[9] Ihne,[10] Hoffmann,[11] etc.

This paper has been divided up into—

I. A succession of flowers for the years 1886 and 1891. The dates of the first appearance of flowers for 1886 are based on the observations of Halsted. In 1891 a large number of data were made by myself and P. H. Rolfs, but I have only selected some of them.

II. A comparison of the appearance of the flowers, leaves, etc., for the years 1886 and 1891. The observations of 1886 are based on those made by Richman under Halsted's[12] direction. Those of the spring of 1891 were made under my direction by Eugene Brown, a special student in botany.

III. Some notes on falling of leaves, especially as influenced by frost. Also a few notes on the effects that frost had on some plants—here again, not to make the paper too lengthy—a large number of observations are omitted. The observations were made on plants in a small garden, so that the conditions were nearly the same. These notes would be more valuable if exact temperatures had been recorded, as Fritsch has done. We hope to continue our observations next year, and keep a record of the temperature.

IV. Some notes on late flowering plants.

[1] Flora Peoriana; The Vegetation in the Climate of Middle Illinois; Illinois Agricultural Society, Vol. III.

[2] The Cayuga Flora.

[2a] Guide to the Flora of Washington and Vicinity.

[3] Bulletin Torrey Botanical Club, Vol. vi. p. 211–213; 235–237.

[4] First and Second Annual Report Wisconsin Agricultural Experiment Station, 1883, p. 56; 1884, p. 59.

[5] Annual Report of the Board of Regents of the University of Wisconsin for 1881.

[6] Bulletin Iowa Agricultural College, Department of Botany, 1886, p. 44.

[7] Thermische Constanten für die Blüthe und Fruchtreife von 889 Pflanzenarten, aus d. K. K. Akad. d. Wissenschaften, Vienna, 1861; Sitzung 28 November, pp. 120, 1 plate, Vienna, 1863.

[8] Sur le Climat de la Belgique, chap. iv.

[9] Die Entwickelung der Vegetation durch die Wärme u. s. w. Jahresb. (33 d. schlesischen Gesellsch. f. vaterländische Cultur in Breslau (1855).

[10] Beiträge zur Phänologie. Giessen, 1884, 178 pp. (Hoffmann and Ihne), Pt. I, E. Ihne; Pt. II, H. Hoffmann.

[11] Ueber den phænologischen Werth von Blattfall und Blattverfärbung, Allg. Forst u. Jagdzeitung, 1888, No. 8; April, 1889, etc.

[12] Bulletin Iowa Agricultural College, 1886, p. 44.

I.—SUCCESSION OF FLOWERS FOR 1886 AND 1891.

NAME.	1886.	1891.
Acer nigrum	April 30.	......
Acer saccharinum	March 22,	April 7.
Amelanchier Canadensis	April 20,	" 26.
Anemone nemorosa	" 20,	" 26.
Antennaria plantaginifolia	" 18,	" 26.
Capsella Bursa-pastoris	" 15,	" 24.
Claytonia Virginica	......	" 19.
Dentaria laciniata	April 20,	" 26.
Dicentra Cucullaria	" 15,	" 20.
Draba Caroliniana	" 20,	" 23.
Erythronium albidum	" 15,	" 28.
Geranium maculatum	May 4,	May 22.
Hepatica acutiloba	April 9,	April 12.
Hydrophyllum Virginicum	May 16,	May 14.
Hypoxis erecta	April 25,	" 14.
Lithospermum canescens	May 1,	" 12.
Mertensia Virginica	April 20,	April 28.
Negundo aceroides	" 16,	" 23.
Oxalis corniculata	......	May 23.
Oxalis violacea	April 23,	" 15,
Pastinaca sativa	May 29,	" 22.
Phlox pilosa	......	" 22.
Podophyllum peltatum	May 7,	" 22.
Populus monilifera	April 18,	April 20.
Prunus Pennsylvanica	May 10,	" 30.
Pyrus coronaria	" 4.	May 13.
Ribes aureum	......	April 28.
Ulmus Americana	April 13,	" 24.
Ulmus fulva	" 23,	" 24.
Viola palmata, var. cucullata	" 18,	" 29.
Viola pubescens	......	" 25.

II.—Calendar of Trees and Shrubs, Ames, Iowa, 1886.

NAME.	MARCH.	APRIL.	MAY.	JUNE.	JULY.	SEPTEMBER.	OCTOBER.	NOVEMBER.
Hard Maple............ (Acer nigrum.)	....	20 L. B. opening.	3 L. 1½ in. long 16 Full leaf.	4 Terminal B formed.	....	2 L. turning. 18 L. falling.	....	....
Soft Maple............ (Acer saccharinum.)	22 In flower.	12 L. B. opening.	16 Full leaf. Fruit falling.	27 Terminal B. formed.	....	....	4 L. turning. 14 L. falling.	....
Hackberry............ (Celtis occidentalis.)	....	20 B. swelling.	23 Full leaf.	....	12 Terminal B. formed.	....	8 L. falling.	....
Honey Locust............ (Gleditschia triacanthos.)	....	14 B. swelling.	3 L. ⅔ in. long. 17 In flower.	....	....	....	1 Seeds ripe. 9 L. falling.	....
Butternut............ (Juglans cinerea.)	....	29 L. B. open.	4 Full leaf.	....	....	....	....	....
Cottonwood............ (Populus monilifera.)	....	12 B. swelling. 20 In flower.	16 Full leaf.	29 Terminal B. formed.	....	....	4 L. turning. 12 L. falling.	....
Wild Crab............ (Pyrus Iowensis.)	....	14 B. swelling.	....	4 Full leaf.	....	....	....	....
Ash Leaved Maple........ (Negundo aceroides.)	....	12 B. swelling. L. 2 in. long.	21 In full leaf.	28 Terminal B. formed.	....	23 Fruit ripe.	2 L. frost-bitten. 5 L. falling.	....
Lilac............ (yringa vulgaris.)	19 B. swelling.	12 B. opening. 26 L. 1 in. long.	3 In flower.	29 Terminal B. formed.	....	....	....	3 L. falling.
White Elm............ (Ulmus Americana.)	....	12 In flower. 20 L. B. swelling.	3 L. 2 in. long. 21 Full leaf.	11 Terminal B. formed.	....	....	2 L. frost-bitten. 12 L. falling.	....

II.—Calendar of Trees and Shrubs, Ames, Iowa, 1891.

NAME.	APRIL.	MAY.	JUNE.	JULY.	SEPT.	OCTOBER.	NOVEMBER.	REMARKS.
Hard Maple................ (Acer nigrum.)	24 L. B. swelling.	3 L. 1⅜-2⅜ in. long. 28 L. 6-10 in. long, incl. petioles.	......	......	....	18 L. becoming yellow. 27 Nearly all off.	....	Leaves fall much earlier and rapidly than soft maple. Tints brilliant. Some variations in falling of leaves.
Soft Maple................. (Acer saccharinum.)	11 In flower. 14 B. swelling.	9 L. 1¼-2¾ in. long. 24 Fruit falling.	......	......	....	17 L. green. 30 L. dry and falling.	1 L. falling rapidly.	Brilliant tints on some trees, not as pronounced as hard maple. Great variations in falling of leaves of trees growing in close proximity.
Hackberry .... (Celtis occidentalis)	13 B. no change. 24 B. swelling.	9 L. ¾-1⅜ in. long. 16 L. 2-3 in. long.	......	......	....	11 L. not frost-bitten. some green, some yellow. 24 L. off or nearly so.	....	Leaves of some trees commence to change their color early, but they seem to hang on well.
Honey Locust............. (Gleditschia triacanthos.)	13 B. no change. 18 B. swelling. 20 B. opening.	16 New wood, 2-4 in. long. L. 2-3⅜ in. long.	......	......	....	18 L. falling.	....	
Coffee Tree............... (Gymnocladus Canadensis.)	13 B. no change. 14 B. swelling. 29 B. opening.	9 L. 1½-2 in. long. 16 L. 3-10 in. long.	......	......	....	10 L. falling, some green. Some trees nearly all off. 24 L. all off.	....	
Butternut.................. (Juglans cinerea.)	15 B. swelling.	9 L. ¾-1⅜ in. long. 16 In flower. 28 L. 8-12 in. long. Catkins falling.	......	......	28 Nuts falling.	10 L. nearly all off.	....	Leaves badly affected with a fungus (*Marsonia Juglandis*).

Sycamore........................ (Platanus occidentalis.)	13 B. no change. 29 B. swelling.	9 L. 1-1⅛ in. long. 16 L. 1-2⅛ in. long.	......	......	....	....	....
Cottonwood............... (Populus monilifera.)	13 B. ⅛-¾ in. long.	16 Seeds falling.	......	......	....	....	....
Wild Crab .... (Pyrus coronaria.)	7 B. no change. 14 B. ⅛-¼ in. long.	9 L. ¾-1⅛ in. long. 13 L. 1-2⅜ in. long. In flower. 23 Petals falling.	......	......	....	....	....
Burr Oak .... (Quercus macrocarpa.)	13 B. no change. 24 B. ¼-½ in. long. L. 1-1¼ in. long.	9 L. 2-2¾ in. long. In flower. 16 L. 3-5 in. long.	......	......	....	10 L. green. 14 L. some red, tinged with yellow. 27 L. all yellow, falling rapidly.	....
Ash Leaved Maple......... (Negundo aceroides.)	1 B. no change. 24 B. slightly swollen. In flower. 29 Flowers falling. L. ½-1 in. long. Fruit ⅛-¼ in. long.	9 L. 1¾-2 in. long. Fruit ½ in. long. 28 L. 2-4 in. long. Fruit 1¼ in. long.	......	......	....	24 L. all off, or nearly so.	....
Lilac....................... (Syringa vulgaris.)	1 B. no change. 7 B. no change. 18 B. ¼-⅜ in. long. 29 L. ⅜-1¼ in. long.	9 L. ⅜-2¼ in. long. In flower. 16 In full bloom. 23 L. 2-3¼ in. long. Out of flower.	......	......	....	14 L. green.	1 L. yellowish green, falling.
White Elm.................. (Ulmus Americana.)	11 B. swelling. 18 In flower.	28 L. 4 5 in. long. Fruit falling.	......	......	....	13 L. yellow, falling.	....

III.—FROST AND BEHAVIOR OF PLANTS.

Portulaca oleracea. Early in September tips slightly affected by frost; Oct. 1st, frost nearly destroyed it; 9th, in an open field, black; 18th, started to grow again.

Amarantus blitoides. Early in September slightly affected by frost; Oct. 7th, frost nearly destroyed it; 9th, black; 18th, no attempt at growth, as in the case of *Portulaca.*

A. albus. Oct. 11th, destroyed by frost.

Apios tuberosa. Oct. 11th, completely killed by frost in low ground.

Panicum sanguinale. Oct. 8th, more or less destroyed by frost.

Panicum capillare. Oct. 8th, more or less destroyed by frost.

Zea Mays. Oct. 7th, young plants completely frozen; 16th, old plants have been dry for several days.

Sorghum vulgare. Oct. 7th, more or less affected.

Cucurbita Pepo and *C. maxima.* Early in September tips slightly frosted; Oct. 9th, plants black.

Lycopersicum esculentum. Early in September tips slightly affected by frost; Oct. 4th, killed by frost; 9th, plants black.

Borrago officinalis. Oct. 22d, a few leaves affected; 23d, many leaves frozen.

Asclepias Syriaca. Oct. 7th, not affected by frost; 11th, slightly frosted in low places; 24th, completely frozen.

Euphorbia heterophylla. Oct. 7th, slightly frosted; 19th, nearly all leaves frosted.

Vitis riparia. Oct. 8th, slightly frosted.

Vitis—Concord grape. Not affected early in September; Oct. 14th, somewhat frost-bitten, some leaves brown; 21st, leaves much frosted; 22d, all frosted, falling rapidly.

Callirhoe pedata. Oct. 7th, not affected by frost; 16th, seriously affected.

Scabiosa atropurpurea. Oct. 7th, no injury whatever; 23d, no injury; Nov. 11th, no injury; 21st, some injury to leaves.

Adonis autumnalis. Oct. 2d, no injury to leaves; 10th, no injury; Nov. 2, no injury to leaves whatever; 21st, no injury to leaves.

Centaurea Cyanus. Oct. 7th, no injury to foliage; 17th, not affected; 18th, heavy frost, not injured; 22d, still green; Nov.

11th, injured seriously; 21st, old plants killed, young seedlings not.

Verbena Aubletia Oct. 7th, no injury; 21st, no injury; Nov. 11th, no injury except to the young shoots.

Leonurus Cardiaca. Oct. 7th, no injury; 23d, no injury; Nov. 21st, young plants not injured.

Lepachys pinnata. Oct. 9th, no injury; 23d, no injury.

Helianthus annuus. Oct. 7th, no injury; 19th, some injury.

Aster multiflorus. Oct. 10th, no injury; 22d, no injury.

Solidago rigida. Oct. 8th, no injury; 10th, no injury; 23d, no injury; Nov. 21st, some leaves injured.

Ligustrum vulgare. Oct. 7th, no injury; Nov. 21, leaves apparently uninjured, reddish green.

Amygdalus Persica. Oct. 19th, no injury, leaves green; heavy frost on 18th; 21st, no injury; Nov. 15th, leaves on young tree green; snow and heavy frost on 14th.

Phlox Drumondii. Oct. 25, no injury; Nov. 1, no injury.

Populus alba. Oct. 11th, no injury, leaves green; 30th, leaves on top branches yellow, the others yellowish green, no injury; Nov. 11th, some leaves black, ice formed during night; 15th, leaves all black.

IV.—LATE FLOWERING PLANTS.

Scabiosa atropurpurea. In flower Nov. 11th; blooms till killed by frost.

Centaurea Cyanus. In flower Nov. 2d; does not cease flowering till it is completely killed.

Adonis autumnalis. Nov. 21st, flowers came out after a very hard frost.

Gilia capitata. Nov. 2d, in flower; first hard frost affected flowering somewhat.

Lepachys pinnata. Oct. 23d, in flower; first hard frost affected flowering; plants grew near a building, otherwise flowering had ceased about three weeks sooner.

Saponaria officinalis. Oct. 8th, in flower in an open garden.

Solidago rigida. Oct. 23d in flower; only one plant in garden was observed; all others ceased to flower some time ago.

Reseda odorata. Oct. 21st, still in flower, not abundant; frost checked flowering.

Callirhoe pedata. A few plants in flower Nov. 2d.

Phlox Drummondii. In flower Nov. 1st, only sparsely.

Pilea pumila In flower Oct. 8th.

Phleum pratense. In flower Oct. 12th.

Gaura Lindheimerii. In flower Oct. 22d.

Oxalis corniculata. In flower Oct. 22d; plants revived after a frost early in October.

Botanical Notes.

The Compilation of the Systematic and Alphabetic Index of New Species of North American Phanerogams and Pteridophytes, published in 1892, is now in preparation at the United States National Herbarium. The index will be more nearly complete and published at an earlier date if all botanists will promptly send to Dr. Vasey, Chief of the Botanical Division, their recent monographs and reprints of articles in botanical works.

Plantæ Schlechterianæ. The undersigned has been fortunate enough to induce a German gardener, Herr Schlecter, established in the Cape Colony, to participate in the publishing of botanical collections from South Africa, and to make an agreement with him concerning the enterprise.

The several centuries are to be distributed at regular intervals; the disposition of the material is left to the choice of the undersigned in concert with various monographers. The first six hundred or even one thousand numbers are destined to be distributed in the course of this year, and have their origin in the sonthern corner of the colony; they are well prepared and perfectly dried.

In accordance with my advice Schlechter has now gone to the northeastern districts of the colony, intending to follow up his explorations in the Transvaal, etc., during the next year. Provided the sale of the first centuries, destined to be given out before the end of the year, be regular and ascertained, the separate price for those of this as well as of next year, will be thirty-five francs. This amount will have to be paid after the receipt of each century.

Inquiries and commissions are to be addressed to the undersigned.

Dr. Hans Schinz,
Professor of Botany at the University, Zurich, Switzerland.

Index to Recent Literature Relating to American Botany.

Anhalonium Lewinii. (Monats. Kakteenk i. 93).

Aristolochia Sipho. (Gard. and For. v. 509; illustrated).

Aster surculosus. (Gard. and For. v. 520, with figure).

Botanical Laboratory—The. G. H. Hicks. (The Speculum, xii. 51).

A description and illustration of the Botanical Laboratory of Agricultural College, Michigan.

Botanical Notes from Central Texas. E. N. Plank. (Gard. and For. v. 351).

Quercus Durandii, Q. macrocarpa, Dalea frutescens, Lonicera albiflora, Vernonia Lindheimeri, Prosopis juliflora, Sapindus acuminatus, Ungnadia speciosa, Solanum heterodoxum, Pellæa ternata, Philibertia undulata, Desmodium Wrightii, Galactia heterophylla, Talinum lineare, Oxalis vespertilionis, Cassia Lindheimeri, C. pumilio, Mollugo Cerviana, Cissus stans, C. incisa, C. Ampelopsis and *Rubus trivialis* are among many interesting plants noted from near Lampasas and Llano.

Botany. (Ottawa Nat. vi. 113).

Among other interesting notes *Asplenium Ruta-muraria* is reported as occurring in the Province of Ontario, it previously not having been known north of Vermont and Michigan. Three northwestern plants, *Helianthus rigidus, Lepachys columnaris* and *Grindelia squarrosa* are also reported as introduced into Canada. So is also *Euphorbia marginata.*

Brunissure et la Maladie de Californie—La. P. Viala et C. Sauvageau (Journ. de Bot. vi. 378).

With illustration of *Plasmodiophora Vitis,* n. sp.

California Vine Disease—The. Newton B. Pearce. (U. S. Depart. Agric. 1892; illustrated).

The preliminary report of investigations covering a period of fifteen months in California as well as in France, Italy and North Africa.

Calochortus Kennedyi. J. G. Baker. (Bot. Mag. t. 7264).
A native of California and Arizona.

Carludovica microcephala. J. D. Hooker. (Bot. Mag. t. 7263).
A native of Costa Rica.

Catasetum Hookeri, Lindl. R. A. Rolfe. (Gardn. Chron. xii. 488).

Cereus Hildmannianus. K. Schum. (Monats. Kakteenk i. 55, with illustration).

Cereus Queretaroensis, Web. A. Mathsson. (Monats. Kakteenk. i. 28).

Chamædorea stolonifera. J. D. Hooker. (Bot. Mag. t. 7265).
A palm native of South Mexico.

Descriptions of New Plants Collected in Mexico by C. G. Pringle in 1890 *and* 1891, *with Notes upon a few other Species.* B. L. Robinson. (Proc. Amer. Acad. xxvii. 165, reprint).

The following thirty-eight plants are described as new: *Cleome Potosina, Viola reptans, Æschynomene petræa, Vigna luteola,* var. *angustifolia, Vigna strobilophora, Cæsalpinia multiflora, Lopesia angustifolia, Oldenlandia Pringlei, Valeriana albonervata, Eupatorium Lemmoni, Xanthocephalum tomentellum, Bellis purpurascens, Erigeron heteromorphus, Melampodium longipilum, Sabazia Michoacana, Gymnolomia canescens, Tithonia brachypappa, Verbesina Potosina, V. Pringlei, Spilanthes Beccabunga,* var. *parvula, S. disciformis, Leptosyne pinnata, Flaveria anomala, Porophyllum Pringlei, Cnicus excelsior, Perezia Michoacana, Androsace* (?) *cinerascens, Dictyanthus tuberosus, Gonolobus suberiferus, Phacelia namatostyla, Lithospermum calcicola, L. revolutum, Ipomœa ornithopoda, Beloporone fragilis, Habenaria Pringlei, Tigridia pulchella* and *Tradescantia angustifolia.* Two new genera are established. *Geissolepis* in the *Compositæ* (*Galinsogeæ*) with one species *G. suædæfolia* and *Coulterophytum* of the *Umbelliferæ* (*Selineæ*) also with one species *C. laxum.*

Destructive Disease Affecting Native Plums—A. John Craig. (Ottawa Nat. vi. 109).

With an illustration of *Cladosporium carpophilum,* and notes on its occurrence on various kinds of American plums.

Development of the Ovule of Aster and Solidago—The. Geo. W. Martin. (Am. Nat. xxvi. 954).

Echinocactus Grusonii, Heldm. (Monats. Kakteenk. i. 4; illustrated).

A rare Mexican species.

Einteilung der Kakteen nach der Salmschem System. (Monats. Kakteenk. i. 156).

Flora of West Virginia. C. F. Millspaugh. (Bull. No. 24, West Va. Agric. Exper. Sta. Vol. II. No. 12, pp. 315–538, Charleston, 1892).

This is a preliminary catalogue of the Flora of West Virginia, a State from which we have hitherto had but little definite botanical information. 1,645 species, varieties and forms are listed, and their distribution indicated, with numerous critical notes of interest and importance. Dr. Millspaugh has fearlessly taken up old generic and specific names, so that his catalogue is a valuable contribution to the nomenclature question. Among the genera accepted as replacing those used in the ordinary text-books are *Bicuculla* for *Dicentra*, *Neckeria* for *Corydalis* (on the last page of the book Dr Millspaugh notes that there is also a moss genus *Neckeria*, and questions which is the older; the Fumariaceous genus has priority; *Beurera* for *Calycanthus*, *Therofon* for *Boykinia*, *Deeringia* for *Cryptotænia*, *Lacinaria* for *Liatris*, *Ridania* for *Actinomeris*, *Adopogon* for *Krigia*, *Pseva* for *Chimaphila*, *Physalodes* for *Nicandra*, *Kœllia* for *Pycnanthemum*, *Agastache* for *Lophanthus*, *Malaxis* for *Microstylis*, *Leptorchis* for *Liparis*, *Gyrostachys* for *Spiranthes*, *Chrosperma* for *Amianthium*, *Chamæraphis* for *Setaria*, *Sieglingia* for *Triodia*, *Corycarpus* for *Diarrhena*, *Panicularia* for *Glyceria*, and *Hystrix* for *Asprella*.

The novelties described are *Syndesmon thalictroides* forma *rosea*; *Delphinium tricorne*, forma *albiflora*; *Polygala sanguinea*, forma *albiflora*; *Rubus odoratus*, var. *Columbianus* (whatever suggested the varietal name ?); *Hydrangea arborescens*, var. *Kanawhana* (this may be *H. glauca*, Raf.); *Œnothera fruticosa*, var. *differta*; *Daucus Carota*, forma *rosea*; *Sambucus racemosa*, forma *albicocca*, Britton; *Houstonia cœrulea*, forma *albiflora*; *Lobelia inflata*, var. *simplex* (Raf.); *Scutellaria galericulata*, forma *albiflora*; *Polygonum Persicaria*, forma *albiflora*; *Acaly-*

pha Virginica, forma *intermedia; Brachyelytrum aristosum*, var. *glabratum*, Vasey; *Polypodium vulgare*, forma *biserratum; Dicranodontium Virginicum*, E. G. Britton; *D. Millspaughii*, E. G. Britton (figured), and *Plagiochila Virginica*, Evans (figured).

The issuing of this catalogue will doubtless be a great stimulus to further botanical exploration in the State. Dr. Millspaugh has only been able to visit a small portion of the territory during the two years that he has had the work in hand, and the number of working botanists in the region is few. We have no doubt that further study will go far towards doubling the number of plants which he has been able to report. The whole country south of Pennsylvania still offers a most attractive ground for collectors, and we hope that it will not be long allowed to await careful search. N. L. B.

Gebirgsflora Alabama's—Die. Carl Mohr (Pharm. Rund. x. 253).

Grasses of the Pacific Slope. George Vasey (U. S. Depart. Agric. Bull. No 13, Washington, 1892).

This fine volume is part I. of Dr. Vasey's work on the grasses of the west coast and contains fifty descriptions and plates of species, many of which are there illustrated for the first time. The plates are up to the usual high standard of excellence and beauty for which the department is famed and the value of the book as a work of reference is greatly enhanced by the citation of the place of publication of the species described. The latter are *Panicum Urvilleanum, Cenchrus Palmeri, Phalaris amethystina, P. Lemmoni, Hierochloa macrophylla, Aristida Californica, Stipa coronata, S. eminens, S. Kingii, S. occidentalis, S. Parishii, S. setigera, S. speciosa, S. Stillmani, S. stricta, Oryzopsis exigua O. Webberi, Muhlenbergia calamagrostidea, M. Californica, M. debilis, M. dumosa, M. Parishii, Alopecurus alpinus, A. Stejnegeri, A. Californicus, A. geniculatus*, L. var. *robustus, A. Howellii, A. Macounii, A. saccatus, Agrostis æquivalvis, A densiflora, A. exarata*, forma *asperifolia, A. Hallii, A. humilis, A. tenuis, Calamagrostis Aleutica, C. Bolanderi, C Breweri, C. crassiglumis, C. Cusickii, C. densa, C. deschampsioides, C. Howellii, C. purpurascens, C. Tweedyi, Deschampsia cæspitosa*, var. *arctica, Trisetum Californicum, T. canescens, T. cernuum, Orcuttia Californica* and *O. Greenei.*

Herbarium Indexes for all the groups of Cryptogams. A. B. Seymour (Cambridge, Mass. Sept. 1892—27 sheets, blue prints. 8×10, price $1.00).

These include only such genera as occur within the United States, and are after the plan of those in use for Phanerogams in the Gray Herbarium. The genera are arranged alphabetically, prefixed by numbers to indicate their systematic order, and will be of great service to all those who limit their collections to this country.—E. G. B.

Hibiscus Moscheutos (Meehan Month. ii. 161. Illustrated).

Kakteen aus dan Staate Vera Cruz. A. Mathsson (Monats. Kakteenk. i. 79).

Lady's Slippers—Hardy (The Garden, xlii. 386). With a colored plate of *Cypripedium acaule and C. pubescens.*

Mamillaria obscura. H. Heldmann (Monats. Kakteenk. i. 52).

Mamillaria Schumannii, Heldm. (Monats. Kakteenk. i. 89, with illustration).

Mangrove Tannin. Henry Trimble (Contr. Bot. Lab. Univ. Penn. i. 50).

With an illustration of a grove of *Rhizophora Mangle.*

Melilotus alba, L.—Preliminary Observations on the Movements of the Leaves of. W. P. Wilson and Jesse M. Greenman. (Contr. Bot. Lab. Univ. Penn. i. 66 with 5 plates.)

Montreal Island—The Flora of. Robert Campbell. (Can. Rec. Sci. v. 208).

Moorea irrorata. J. D. Hooker (Curt. Bot. Mag. xlviii. t. 7262). An orchid from the Andes of South America.

Mountain Flora of Alabama—The. Charles Mohr. (Gard. and For. v. 507).

Oaks of North America (Hardwood ii. No. 8).

Oak-pruners—The. John B. Smith. (Gard. and For. v. 557. Illustrated).

Pilocereus senilis cristatus. A. Mathsson. (Monats. Kakteenk. i. 32. Illustrated.)

Pinus edulis. (Gard. Chron. xii. 563. Illustrated).

Phyllocactus Phyllanthus, Lk. (Monats. Kakteenk. xi. 72. Illustrated). Notes on this Brazilian species.

Plant Diseases—Report on the experiments made in 1891 *in the Treatment of.* (U. S. Depart. Agric. Washington, 1892. Illustrated).

Plantain—A Rare. H. P. Keyes (Gard. & For. v. 550). Note on the discovery of *Plantago media*, at Framington, Maine.

Post Laramie Beds of Middle Park, Colo. Whitman Cross. (Read before the Colo Sci. Soc. Oct. 3, 1892. Pamph. 8vo, pp. 27).

Under the heading, "Age of the Middle Park Bed," the author utilizes the evidence afforded by fossil plants to determine the age of certain beds. He criticises their reference by Lesquereux to the Laramie Lignitic group and shows that this reference was probably due to an attempt to make the plants fit in the place where the stratigraphical geologists thought they ought to belong, combined with a manifest disarrangement of labels. A careful revision of the specimens upon which Lesquereux's conclusions were founded, in addition to new material since collected leads the author to conclude that the Middle Park beds are post-Laramie in age. A list of twenty-eight species of fossil plants is included. A. H.

Quercus densiflora (Gard and For. v. 517. Illustrated).

Rudbeckia hirta, L.—A. Monstrous Specimen of. J. T. Rothrock (Contr. Bot. Lab. Univ. Penn. i. 3. Illustrated).

Sequoia gigantea—A Museum Specimen of (Gard. & For. v. 451.)

Two illustrations and a most realistic description of the felling of one of the giant Redwoods in Fresno Co. Calif. are given. The particular tree figured girthed sixty-two feet at eight feet from the ground and ninety feet at the surface and a section of the trunk twenty feet in diameter is now on exhibition in the Jesup collection of American woods in the American Museum of Natural History.

The Flora of the Dakota Group. A posthumous work by Leo Lesquereux. Edited by F. H. Knowlton. (Monograph no. xvii. U. S. Geol. Survey, pp. 400, including 66 plates. Washington, 1891).

In this volume we have the latest contribution to our knowledge of the cretaceous flora of North America. The work will always be known as that of Prof. Lesquereux, but the laborious and thankless work of the editor should not be lost sight of. The editor of a posthumous work has always a delicate position to fill, as he is constantly called upon to choose between allowing real or apparent errors to remain or correcting them to the best of his ability and perhaps making the author say what he never intended to say. In this volume the editor has adopted a conservative course, preferring to suffer criticism from modern purists rather than to alter the manuscript, or known preferences of Prof. Lesquereux except in cases where errors of importance were manifest. A short sketch of the life and work of Prof. Lesquereux is included in the author's preface, whrch is followed by an account of the discoveries in various localities of the flora recognized as belonging to the Dakota group. An interesting general discussion or analysis of the flora occupies about thirty pages in which attention is called to the significance of many of the facts involved. There is no doubt that many of the problems connected with the study of the geographical distribution of plants at the present day could be solved, at least in a large measure, by a careful comparison of the extinct flora with that now in existence in the same locality and the more nearly we approach modern times the more significant are the results which are obtained. Thus in regard to the present work the author says: "Already the evidence obtained from the study of the Dakota Group remains warrants the conclusion that the flora of North America is not at the present epoch, and has not been in past geological times composed of foreign elements, brought to this continent by migration, but that it is indigenous. Its types are native; the diversity of their representatives has been produced by physical influences; their affinities, therefore, or the relation of their modification or derived forms can not be looked for in the vegetation of distant countries." To the botanist the principal interest will center in the Dicotyledones, which constitute the bulk of the work. Most of them are referred to living genera or genera so nearly allied that their affinities are indicated by such names as *Rhamnites*, *Celastrophyllum*, *Menispermites*, *Palæocassia*, *Viburnites*, *Populites*, etc., early ancestors of our familiar trees and shrubs of to-day. In this connection, from among the many interesting examples, attention might be called particularly to the species figured under the genus *Liriodendron*, in which some dozen forms of great variety are shown, represented to-day by our one species, *L. Tulipifera.*

The one serious criticism which might be made is one which could be applied to nearly every recent work on palaeobotany, viz.: the unnecessary multiplication of species and varieties Leaf forms which vary between themselves far less than do the leaves on many an individual tree or bush are given varietal or specific rank. Even some genera are founded upon such slight differences that they are open to suspicion. In this connection attention might be called to Plates iv. and v., where *Betulites Westii* and *B. Snowii* with their varieties are figured. If such species and varieties are to be considered in the same sense as they are considered in botany, that is as representing each a distinct type of tree or shrub, then there should certainly be an earnest protest entered against the abuse of this too prevalent custom. Minor flaws might be picked out, such as the method of numbering on the plates, by which the figures and their corresponding numbers are sometimes so arranged that in case of hasty reference confusion might ensue. The scientific value of the work, however, is what concerns the student and by him it will be heartily welcomed, especially so as a large number of the types described are identical with those from the cretaceous of Eastern North America and are familiar objects in the clays of New Jersey and southward. A. H.

Trees of the Northern United States, their Study, Description and Determination, for the Use of Schools and Private Students. Austin C. Apgar. (Small 8vo., pp. 224; illustrated).

Professor Apgar has written a very useful little book, that will doubtless do much toward spreading an interest in trees and their study. He gives good and concise botanical descriptions of all the species, both native and introduced, that have come under his notice as growing north of Virginia and Missouri and east of the Rocky Mountains, accompanied by illustrations of their foliage and in some instances of flowers and fruit; these illustrations have been very well drawn, and for the most part well selected. We note an apparent mistake on page 100, where the leaves of *Prunus Virginiana* and *P. serotina* have evidently been transposed in the make-up of the book, the obovate leaf attributed to *P. serotina* being characteristic of the other tree; the leaf illustrating *Cratægus tomentosa* is badly chosen and that taken for *C. coccinea* is hardly typical.

The book is written in a much more scientific vein than Mr. Newhall's "Trees of Northeastern North America," and the cuts are superior to those in that work. The descriptive portion is prefaced by chapters on roots, stems and branches, leaves, flowers and fruit, the winter study of trees, the preparation of a collection, figures used in description and a plan and models for tree description.

The author has made a very serious mistake in using the nomenclature of Gray's Manual, rather than the principles adopted by Professor Sargent in his Silva and in Garden and Forest, and by the officials of the Forestry Division of the United States Department of Agriculture. There is no doubt that this will seriously limit the usefulness and circulation of his book.

N. L. B.

Proceedings of the Club.

WEDNESDAY EVENING, OCTOBER, 26, 1892.

Vice-President Allen in the chair and seventeen persons present.

Mr. Wm. H. Smith, Miss Idalette Carpenter, Dr. Georgia A. Cassidy, Dr. Helen O'Connor and Mr. G. H. Van Wagenen were elected active members.

The resignation of the Secretary, Mrs. M. O. Lebrun, was then read and accepted after some remarks by Dr. Morong, in which he expressed the appreciation of the entire club, of the long and efficient services rendered by Mrs. Lebrun as Secretary. Upon motion of Dr. Morong, a vote of thanks was unanimously extended to Mrs. Lebrun. Dr. Britton then moved that a committee of two be appointed by the Chair to make arrangements for expressing in tangible form the feelings of the Club as expressed in Dr. Morong's motion. The motion was seconded and unanimously adopted, and Mrs. E. G. Britton and Dr. Emily L. Gregory were appointed such committee.

Dr. Rusby was elected Secretary of the Club.

Dr. Morong, read the two announced papers of the evening viz., "Notes on a Revision of the North American Naiadaceæ," and "Observations on the North American Species of Orchidaceæ and their Nomenclature." At the close of the reading of his paper, Dr. Morong spoke of the great desirability of having his paper on the Naiadaceæ, which was to be published in the Memoirs of the Club, well illustrated, and hoped that it might be possible to make arrangements to this end. Dr. Britton remarked upon the same subject, and moved that a committee consisting of the Treasurer, Secretary and Editor, be appointed to devise ways and means for such illustration which it was estimated would require about $250 more than could be spared from the funds of the Club. The motion was seconded and unanimously carried.

TUESDAY EVENING, NOVEMBER 8th, 1892.

The President in the chair and seventeen persons present. Miss C. A. Timmerman was elected Secretary pro tem.

The announced papers of the evening were then read. The first was by Mr. John K. Small, "Preliminary Notes on a Monograph of the American Species of the Genus *Polygonum*," illustrated by herbarium specimens; several new species were shown.

Mr. Hogg spoke of a dye used in Japan and made from a species of *Polygonum*.

The second paper was read by Mrs. Britton, "Remarks on Some Mosses of Northern New York." Mrs. Britton stated that this was a particularly rich region for Bryophytes. *Dicranum viride* had been discovered in fruit. *Zygodon conoideus*, sterile, which had been found fruiting in Virginia during the past spring, had also been collected, these being the only two stations known for this genus in North America.

DEATH OF DR. NEWBERRY.

Dr. John Strong Newberry, for many years President of the Club, died at his home, in New Haven, Conn., on Wednesday evening, December 8th. An account of his life and important contributions to North American Botany will appear in an early number of the BULLETIN.

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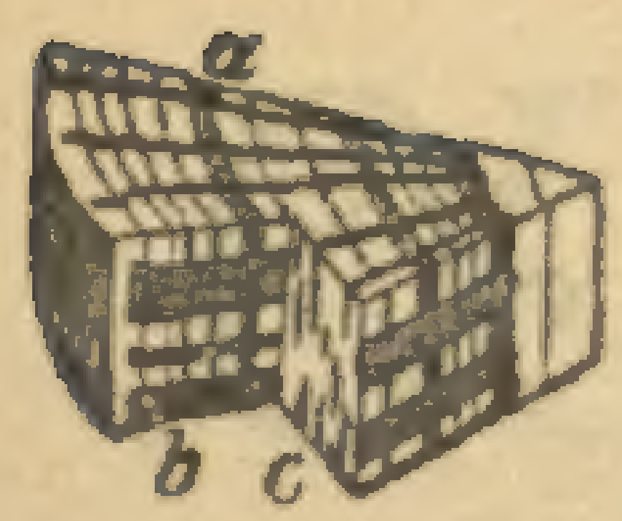

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